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Number 100

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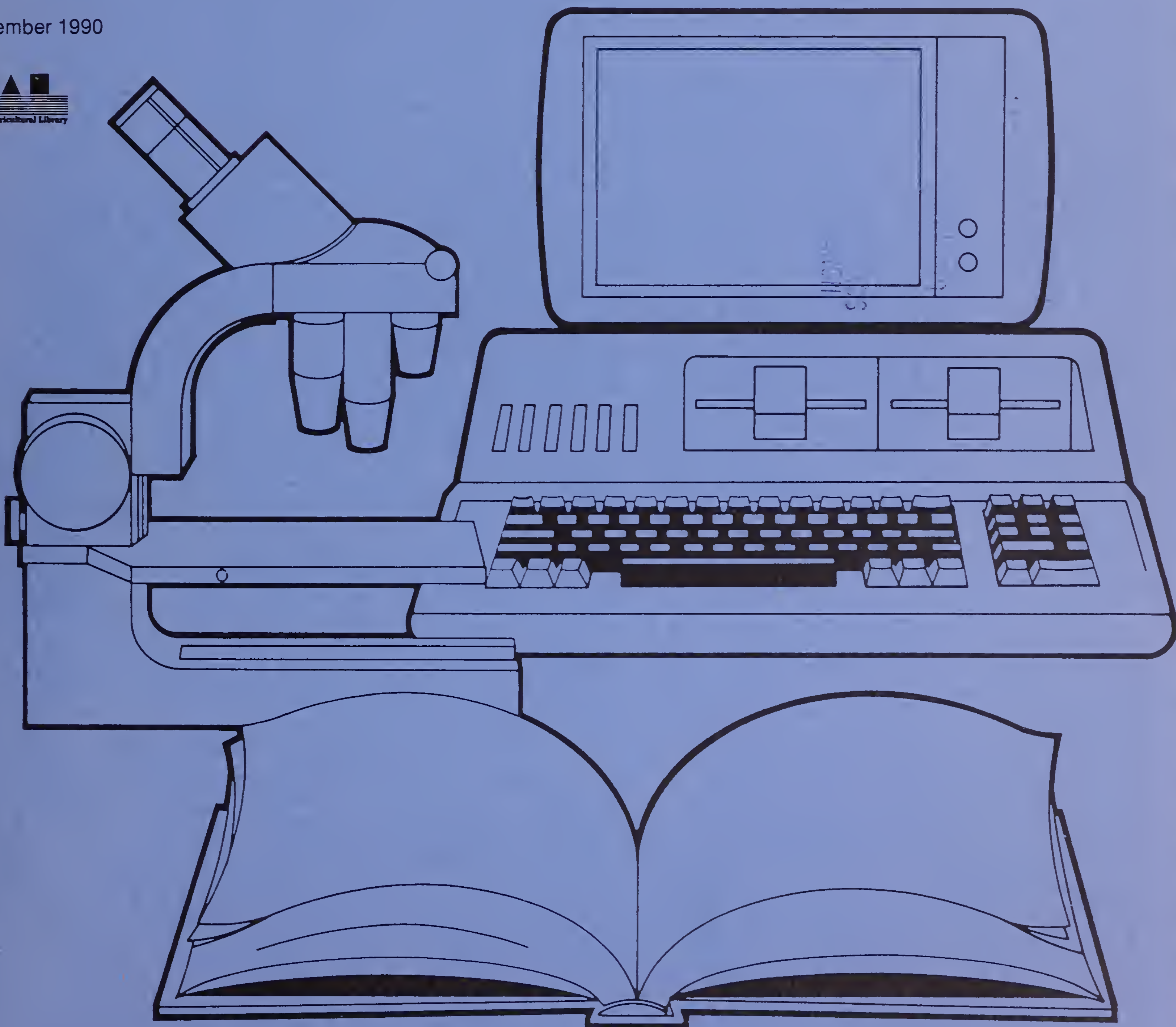
The Protection of Beans, Peas and Lentils, 1979 - April 1990

Citations from AGRICOLA Concerning Diseases and other Environmental Considerations



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Compiled and Edited by

Charles N. Bebee
National Agricultural Library

National Agricultural Library
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FOREWORD

This is the 37th volume in a series of commodity-oriented environmental bibliographies resulting from a memorandum of understanding between the U.S. Department of Agriculture, National Agricultural Library (USDA-NAL), and the U.S. Environmental Protection Agency, Office of Pesticide Programs (EPA-OPP).

This close working relationship between the two agencies will produce a series of bibliographies which will be useful to EPA in the regulation of pesticides, as well as to any researcher in the field of plant or commodity protection. The broad scope of information contained in this series will benefit USDA, EPA, and the agricultural community as a whole.

The sources referenced in these bibliographies include the majority of the latest available information from U.S. publications involving commodity protection throughout the growing and processing stages for each agricultural commodity.

We welcome the opportunity to join this cooperative effort between USDA and EPA in support of the national agricultural community.

JOSEPH H. HOWARD, Director	DOUGLAS D. CAMPT, Director
National Agricultural Library	Office of Pesticide Programs

INTRODUCTION

The citations in this bibliography, The Protection of Beans, Peas and Lentils, are selected from the AGRICOLA (AGRICultural OnLine Access) database limited to those produced by North American authors. They cover articles or monographic publications added to the database from 1979 - April 1990.

This is the 37th bibliography in a series of commodity-oriented listings of citations from AGRICOLA jointly sponsored by the U.S. Department of Agriculture, National Agricultural Library (USDA-NAL), and the U.S. Environmental Protection Agency, Office of Pesticide Programs (EPA-OPP). Additional volumes issued recently include The Protection of Cotton, 1985 - 1989, The Protection of Soybeans, 1985 - 1989, The Protection of Small Fruits and Berries, The Protection of Grapes and Cherries, The Protection of Ornamental Plants, The Protection of Farm Animals, and The Protection of Wildlife and Vertebrate Pest Control. The 1990 volumes include The Protection of Tropical and Subtropical Fruits, The Protection of Small Grains (other than Wheat, Rice or Sorghums), The Protection of Cucurbits, The Protection of Minor Vegetable Crops, The Protection of Beans, Peas, and Lentils, and The Protection of Forestry.

Entries in the bibliography are subdivided into a series of section headings used in the contents of the Bibliography of Agriculture. Each item appears under every section heading assigned to the cited document. A personal author index is also included in the publication and a site index to plants follows the personal author index.

The U.S. Environmental Protection Agency contact for this project is Richard B. Peacock, Office of Pesticides and Toxic Substances.

Any comments or questions concerning this bibliography may be addressed to the compiler and editor:

Charles N. Bebee
Special Services Branch
USDA-NAL, Room 1402
Beltsville, MD 20705
(301) 344-3875

Errata
4,48,118,375,458,660,666,680,742,750,755,770,774,873,936,948,952,
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1301,1302,1306

EPA BIBLIOGRAPHY

The Protection of Beans, Peas and Lentils, 1979 - April 1990

Contents

EPA BIBLIOGRAPHY

METEOROLOGY AND CLIMATOLOGY

0001

Aerial dispersal of clusters of spores.
Ferrandino, F.J. Aylor, D.E. Boston : The Society, 1985. 17th Conference on Agricultural and Forest Meteorology and seventh Conference on Biometeorology and Aerobiology, May 21-24, 1985, Scottsdale, Ariz. : preprint volume / sponsored by the American Meteorological Society. p. 298-299. Includes references. (NAL Call No.: DNAL S600.2.C6 1985).

0002

Interpretation and measurement of leaf wetness in a row crop.
Weiss, A. Lukens, D.L.; Steadman, J.R. Boston : The Society, 1985. 17th Conference on Agricultural and Forest Meteorology and seventh Conference on Biometeorology and Aerobiology, May 21-24, 1985, Scottsdale, Ariz. : preprint volume / sponsored by the American Meteorological Society. p. 60. Includes references. (NAL Call No.: DNAL S600.2.C6 1985).

HISTORY

0003

Cowpea history, production, and research in Mississippi.
TAEMA. Hare, W.W. College Station, Tex. : The Station. Miscellaneous publication MP - Texas Agricultural Experiment Station. In the series analytic: Cowpea production and research--historical and current perspectives / edited by J. Creighton Miller, Jr. Proceedings of a Workshop, held February 5, 1979, New Orleans, Louisiana. Feb 1988. (1639). p. 16-18. (NAL Call No.: DNAL 100 T31M).

LEGISLATION

0004

Control of pests with annonaceous acetogenins. Mikolajczak, K.L. McLaughlin, J.L.; Rupprecht, J.K. Washington, D.C.? : The Department. Tetrahydrofuranoid acetogenins characteristic of the Annonaceae plant family have been found to have potent pesticidal and feeding deterrent activity against a diverse variety of pests such as mosquito larvae, spider mites, aphids, the Mexican bean beetle, striped cumcumber beetle, blowfly larvae, and nematodes. A new acetogenin called "asimicin" having the following structural formula has been isolated and is typical of the subject class of useful compounds. United States Department of Agriculture patents. Copies of USDA patents are available for a fee from the Commissioner of Patents and Trademarks, U.S. Patents and Trademarks Office, Washington, D.C. 20231. Jan 26, 1988. (4,721,727). 1 p. Includes references. (NAL Call No.: DNAL aT223.V4A4).

0005

Medium for the isolation of Pseudomonas cepacia biotype from soil and the isolated biotype. Lunmsden, R.D. Sasser, M. Washington, D.C.? : The Department. Abstract: A new biotype, SDL-POP-S-1, of the soilborne beneficial bacterium Pseudomonas cepacia NRRL B-14149 has been discovered. The biotype is very effective in controlling Pythium diseases of cucumbers and peas. A new medium that is exclusively selective for the bacterium Pseudomonas cepacia has also been developed. United States Department of Agriculture patents. Copies of USDA patents are available for a fee from the Commissioner of Patents and Trademarks, U.S. Patents and Trademarks Office, Washington, D.C. 20231. May 13, 1986. (4,588,584). 1 p. Includes references. (NAL Call No.: DNAL aT223.V4A4).

0006

Vegetable abundance: from yardlong cowpeas to bitter melons.
Wittwer, S. East Lansing : Michigan State University Press, 1987. Feeding a billion : frontiers of Chinese agriculture / by Sylvan Wittwer ... et al. . p. 253-269. ill. Includes references. (NAL Call No.: DNAL HD2098.F45).

0007

Dry edible bean field harvesting losses.
TAAEA. Smith, J.A. St. Joseph, Mich. : The Society. Transactions of the ASAE - American Society of Agricultural Engineers. Nov/Dec 1986. v. 29 (6). p. 1540-1543. Includes references. (NAL Call No.: DNAL 290.9 AM32T).

0008

Economic analysis of four weed management systems.
WEESA6. Lybecker, D.W. Schweizer, E.E.; King, R.P. Champaign, Ill. : Weed Science Society of America. An economic analysis of four weed management systems employed on four crop sequences in a barley-corn-pinto bean-sugarbeet rotation in eastern Colorado was computed. Weeds were controlled in each crop with only conventional tillage or conventional tillage plus minimum levels of herbicide (systems 3 and 4), moderate levels of herbicides (system 1), or intensive levels of herbicides (system 2). Adjusted gross returns were higher for systems 3 and 4 where herbicide use was less/year and decreased over 4 yr than for systems 1 and 2 where herbicide use was higher/year and constant. When the four crop sequences were aggregated using yield and sucrose indices, the least herbicide-intensive weed management system had $440/ha/4 yr higher indexed adjusted gross return than the most herbicide-intensive weed managment system. An income risk analysis showed that the herbicide-intensive weed management system was not risk efficient and that producers would select one of the other three less herbicide-intensive weed management systems depending upon their risk preferences. Weed science. Nov 1988. v. 36 (6). p. 846-849. Includes references. (NAL Call No.: DNAL 79.8 W41).

0009

Economic losses and control of nightshade in dry beans.
Mitich, L.W. Kyser, G.B. Sacramento, Calif. : California Weed Conference Office. Proceedings - California Weed Conference. 1986. (38th). p. 128-135. Includes references. (NAL Call No.: DNAL 79.9 C122).

0010

Presence--absence sequential decision plans for Tetranychus urticae (Acari: Tetranychidae) in garden-seed beans, Phaseolus vulgaris.
JEENAI. Bechinski, E.J. Stoltz, R.L. College Park, Md. : Entomological Society of America. Journal of economic entomology. Includes statistical data. Dec 1985. v. 78 (6). p. 1475-1480. Includes references. (NAL Call No.: DNAL 421 J822).

0011

Spray timing and economic threshold for the pea aphid Acyrthosiphon pisum (Homoptera: Aphididae), on field peas in Manitoba.
JEENAI. Maiteki, G.A. Lamb, R.J. College Park, Md. : Entomological Society of America. Journal of economic entomology. Dec 1985. v. 78 (6). p. 1449-1454. Includes references. (NAL Call No.: DNAL 421 J822).

0012

United States standards for whole dry peas, split peas, and lentils /United States Department of Agriculture, Federal Grain Inspection Service.
United States.~Federal Grain Inspection Service. Washington, D.C. : The Service, 1989 . "Effective date whole dry peas 1-18-89, split peas 1-18-89, lentils 8-01-88.". 1 v. (various pagings) ; 28 cm. Includes bibliographical references. (NAL Call No.: DNAL aSB343.U5).

0013

Effect of paraplowing on wheat and fresh pea yields.
Wilkins, D.E. Rasmussen, P.E.; Kraft, J.M. St. Joseph, Mich. : The Society. American Society of Agricultural Engineers (Microfiche collection). Paper presented at the 1986 Winter Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St. Joseph, Michigan 49085. Telephone the Order Dept. at (616) 429-0300 for information and prices. 1986. (fiche no. 86-1516). 13 p. Includes references. (NAL Call No.: DNAL FICHE S-72).

0014

Effects of plant diversity and density on the emigration rate of two ground beetles, Harpalus pennsylvanicus and Evarthrus sodalis (Coleoptera: Carabidae), in a system of tomatoes and beans.
EVETEX. Perfecto, I. Horwith, B.; Vandermeer, J.; Schultz, B.; McGuinness, H.; Dos Santos, A. College Park, Md. : Entomological Society of America. Environmental entomology. Oct 1986. v. 15 (5). p. 1028-1031. ill. Includes references. (NAL Call No.: DNAL QL461.E532).

0015

Effects of soil solarization on Rotylenchulus reniformis in the lower Rio Grande Valley of Texas.
JONEB. Heald, C.M. Robinson, A.F. Raleigh, N.C. : Society of Nematologists. Journal of nematology. Jan 1987. v. 19 (1). p. 93-103. Includes references. (NAL Call No.: DNAL QL391.N4J62).

0016

Using yield trial data to analyze the physiological genetics of yield accumulation and the genotype X environment interaction effects on yield.
Wallace, D.H. Masaya, P.N. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1988. v. 31. p. vii-xxiv. Includes references. (NAL Call No.: DNAL SB327.A1B5).

0017

Yield response of watermelon, tomato and pigeon pea to land preparation techniques in southern Puerto Rico.
JAUPA. Lugo-Mercado, H.M. Badillo-Feliciano, J.; Ortiz-Alvarado, F.H. Mayaguez : University of Puerto Rico, Agricultural Experiment Station. The Journal of agriculture of the University of Puerto Rico. Apr 1987. v. 71 (2). p. 203-208. Includes references. (NAL Call No.: DNAL 8 P832J).

0018

Bean foliage consumption by Mexican bean beetle (Coleoptera: Coccinellidae) and its effect on yield.
JKESA. Kabissa, J. Fronk, W.D. Lawrence, Kan. : The Society. Journal of the Kansas Entomological Society. Apr 1986. v. 59 (2). p. 275-279. Includes references. (NAL Call No.: DNAL 420 K13).

0019

Commercial lima bean production.
Binning, L.K. Wyman, J.A.; Bundy, L.G.; Stevenson, W.R. Madison, Wis. : The Programs. Publication - Cooperative Extension Programs. University of Wisconsin - Extension. Jan 1985. (A2338). 4 p. (NAL Call No.: DNAL S544.3.W6W53).

0020

Commercial vegetable production: lima beans.
McLaurin, W.J. Barber, J.M.; Colditz, P. Athens, Ga. : The Service. Circular - Cooperative Extension Service, University of Georgia. Oct 1985. (716,rev.). 4 p. (NAL Call No.: DNAL 275.29 G29C).

0021

Dry edible bean field harvesting losses.
TAAEA. Smith, J.A. St. Joseph, Mich. : The Society. Transactions of the ASAE - American Society of Agricultural Engineers. Nov/Dec 1986. v. 29 (6). p. 1540-1543. Includes references. (NAL Call No.: DNAL 290.9 AM32T).

0022

Economic injury level, action threshold, and a yield-loss model for the pea aphid, Acyrthosiphon pisum (Homoptera: Aphididae), on green peas, Pisum sativum.
JEENAI. Yencho, G.C. Getzin, L.W.; Long, G.E. College Park, Md. : Entomological Society of America. Journal of economic entomology. Dec 1986. v. 79 (6). p. 1681-1687. Includes references. (NAL Call No.: DNAL 421 J822).

0023

Effect of chlordimeform on tarnished plant bug (Heteroptera: Miridae) nymph emergence.
JEENAI. Bailey, J.C. Cathey, G.W. College Park, Md. : Entomological Society of America. Journal of economic entomology. Dec 1985. v. 78 (6). p. 1485-1487. Includes references. (NAL Call No.: DNAL 421 J822).

0024

Effect of nitrogen fertilizers and fungicides on white mold disease and yield of pinto beans in North Dakota.
PNDAAZ. Venette, J.R. Albaugh, D.A.; Kemp, S.W. Grand Forks, N.D. : The Academy. Proceedings of the North Dakota Academy of Science. Apr 1985. v. 39. p. 35. Includes references. (NAL Call No.: DNAL 500 N813).

0025

The effect of soil pH on wheat and lentils grown on an agriculturally acidified northern Idaho soil under greenhouse conditions.
CSOSA2. Mohebbi, S. Mahler, R.L. New York, N.Y. : Marcel Dekker. Communications in soil science and plant analysis. Feb 1989. v. 71 (3/4). p. 359-381. Includes references. (NAL Call No.: DNAL S590.C63).

0026

Effect of subsoiling and irrigation regime on dry bean production in the Pacific Northwest.
SSSJD4. Miller, D.E. Madison, Wis. : The Society. Soil Science Society of America journal. May/June 1987. v. 51 (3). p. 784-787. Includes references. (NAL Call No.: DNAL 56.9 S03).

0027

Effects of fertilization and in-row spacing on performance of two BBL type cultivars.
Mullins, C.A. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1988. v. 31. p. 166. (NAL Call No.: DNAL SB327.A1B5).

0028

Effects of lime type on yields and leaf concentrations of several vegetable crops as related to soil test levels.
JOSHB. Smith, C.B. Demchak, K.T.; Ferretti, P.A. Alexandria, Va. : The Society. Journal of the American Society for Horticultural Science. Nov 1986. v. 111 (6). p. 837-840. Includes references. (NAL Call No.: DNAL 81 S012).

0029

Effects of location and plant density on yield and architectural traits in dry beans.
CRPSAY. Nienhuis, J. Singh, S.P. Madison, Wis. : Crop Science Society of America. Crop science. July/Aug 1985. v. 25 (4). p. 579-584. ill. Includes 15 references. (NAL Call No.: DNAL 64.8 C883).

0030

Effects of nitrogen fertilization on production of mechanically harvested snap beans.
HJHSA. Mullins, C.A. Alexandria, Va. : American Society for Horticultural Science. HortScience. Feb 1987. v. 22 (1). p. 34-36. Includes references. (NAL Call No.: DNAL SB1.H6).

0031

Growing lima beans.
Williams, J.L. Strother, G.; Gazaway, W.S.; Patterson, M. Auburn, Ala. : The Service. Circular ANR - Cooperative Extension Service, Auburn University. Dec 1986. (215). 4 p. (NAL Call No.: DNAL S544.3.A2C47).

0032

Growth stages of field peas sensitive to damage by the pea aphid, Acyrthosiphon pisum (Homoptera: Aphididae).
JEENAI. Maiteki, G.A. Lamb, R.J. College Park, Md. : Entomological Society of America. Journal of economic entomology. Dec 1985. v. 78 (6). p. 1142-1448. Includes references. (NAL Call No.: DNAL 421 J822).

0033

Line source herbigation of cinmethylin (SD-95481) for grass control in pinto beans.
WSWPA. Arnold, R.N. Gregory, E.J.; Smeal, D. Reno, Nev. : The Society. Proceedings - Western Society of Weed Science. 1987. v. 40. p. 133-140. (NAL Call No.: DNAL 79.9 W52).

0034

NF-10 bioactivators enhance photosynthesis, plant growth, yield and quality in commercial crops.
PPGGD. Tenzer, A.I. Lake Alfred, Fla. : The Society. Proceedings annual meeting - Plant Growth Regulator Society of America. 1987. (14th). p. 316-325. Includes references. (NAL Call No.: DNAL SB128.P5).

0035

Ontogeny and yield response of common and tepary beans to temperature.
AGJOAT. Scully, B. Waines, J.G. Madison, Wis. American Society of Agronomy. Temperature affects crop development and yield. In this study the effect of temperature on emergence, vegetative development, and yield of common bean (Phaseolus vulgaris L.) and tepary bean (P. acutifolius A. Gray) was compared. In the growth chamber nine common bean accessions were evaluated for emergence response over planting depths of 25, 50, and 75 mm, and at constant temperatures of 15, 20, 25, 30, and 35 degrees C. The three depths had no significant effect on emergence between 20 and 30 degrees C, but at 15 and 35 degrees C the increased depth significantly delayed emergence. The most rapid germination and emergence occurred at 30 degrees C under these controlled conditions. In the field emergence of the same common bean accessions was compared to tepary bean; tepary bean emerged about 1.5 d earlier than common bean at soil temperatures of 18 to 28 degrees C. The effect of temperature on vegetative development was evaluated by a linear heat unit system that measured base temperature (Tbase) and heat units to flowering. Under field conditions common bean had an average base temperature (Tbase) lower than tepary bean, and required more heat units to flower. Genotypic differences for base temperatures and heat unit requirements existed among accessions within both species when grown at Riverside, CA, on an Arlington fine sandy loam (coarse-loamy, mixed, thermic Haplic Durixeralf). Tepary bean produced higher yields than common bean under hot summer conditions, but lower yields under early spring conditions. Agronomy journal. Nov/Dec 1988. v. 80 (6). p. 921-925. Includes references. (NAL Call No.: DNAL 4 AM34P).

0036

Paclobutrazol induced sulfur dioxide, chiling, and high temperature tolerance in snap bean plants.
PPGGD. Lee, E.H. Byun J.K.; Wilding, S.J.; Steffens, G.L. Lake Alfred, Fla. : The Society. Proceedings of the Plant Growth Regulator Society of America. Meeting held on July 28-August 1, 1985, Boulder, Colorado.~ Includes abstract. 1985. (12th). p. 78. (NAL Call No.: DNAL SB128.P5).

0037

The pea cyst nematode.
NASSD. Di Vito, M. Greco, N. New York, N.Y. : Plenum Press. NATO advanced science institutes series : Series A : Life sciences. In the series analytic: Cyst nematodes / edited by F. Lamberti and C.E. Taylor.~ Literature review. 1986. v. 121. p. 321-322. Includes references. (NAL Call No.: DNAL QH301.N32).

0038

Performance of dry beans grown on the coastal plains of Puerto Rico.
JAUPA. Beaver, J.S. Badillo-Feliciano, J.; Reyes-Soto, I. Mayaguez : University of Puerto Rico, Agricultural Experiment Station. The Journal of agriculture of the University of Puerto Rico. Apr 1985. v. 69 (2). p. 125-133. Includes references. (NAL Call No.: DNAL 8 P832J).

0039

Planting date and temperature effects on germination, emergence, and seed yield of chickpea.
AGJOAT. Auld, D.L. Bettis, B.L.; Crock, J.E.; Kephart, K.D. Madison, Wis. : American Society of Agronomy. Commerical production of chickpea (Cicer arietinum L.) in the Palouse region of northern Idaho and eastern Washington was initiated in 1981. Since the cool springs and short growing season of this area limit the adaptation of chickpea, field and laboratory studies evaluating 10 chickpea lines were conducted to optimize the planting date of this new pulse crop. Laboratory germination and radicle elongation of the 10 lines at 5, 13, and 20 degrees C were compared to field emergence and seedling growth at Moscow, ID, on a Palouse silt loam (fine-silty, mixed, mesic Pachic Ultic Haploxeroll) during 1982 and 1984. The 10 lines were also planted in late April, early May, and late May to determine the effect of planting date on yield components and seed yield. Greatest germination and radicle elongation of all 10 lines occurred at 20 degrees C. At 5 degrees C, less than half of the seed germinated within 7 d, and radicle elongation was less than 4% of that observed at 20 degrees C. The 10 lines did not differ in their ability to germinate under cold conditions in the laboratory. Under field conditions of 1984, the Desi lines with pigmented testa showed a higher percentage of emergence than the non-pigmented Kabuli lines. Seedling dry weight accumulation was most rapid in the large seeded Kabuli seedlings and slowest in the smaller seeded Desi seedlings. Planting in late April produced higher seed yields than planting in late May (34 and 5% in 1982 and 1984, respectively). However, seedling emergence was slower at the early planting date. These results indicate that chickpea grown in areas with cool climates such as northern Idaho should be planted in the early spring when average soil temperatures exceed 13 degrees C to insure optimum seed yield. Agronomy journal. Nov/Dec 1988. v. 80 (6). p. 909-914. Includes references. (NAL Call No.: DNAL 4 AM34P).

0040

Production of snap beans as affected by soil tillage method and row spacing.
JOSHB. Mullins, C.A. Straw, R.A.; Coffey, D.L. Alexandria, Va. : The Society. Conventional tillage (CT), no-tillage (NT), and rotary strip-tillage (RT) methods were combined with row spacings of 0.46 m (28 plants/m2) and 0.92 m (56 plants/m2) in 1985 and 1986 snap bean (Phaseolus vulgaris L.) tests with a split-plot factorial arrangement of treatments. Yields were lowest with NT and 0.92-m row spacings both years, while plant stands were lowest with NT and RT. Plant lodging was lowest with NT and highest with CT each year. Pod clustering and broken pods following machine harvest were lowest with NT both years, while rotten pods and percentage no. 2 to 4 sieve-size pods were lowest with NT in 1986. Incidence of broken pods was higher with the 0.46-m row spacing than with the 0.92-m row spacing in 1985 and the incidence of rotten pods was greatest with the 0.46-m row spacing in 1986. The 0.46-m row spacing improved yields over the 0.92-m spacing, with minimal difference in pod quality. Weed control was less effective with NT than with CT and RT methods. Journal of the American Society for Horticultural Science. Sept 1988. v. 113 (5). p. 667-669. (NAL Call No.: DNAL 81 S012).

0041

Row spacing, plant population, and genotype X row spacing interaction effects on yield and yield components of dry bean.
AGJOAT. Grafton, K.F. Schneiter, A.A.; Nagle, B.J. Madison, Wis. : American Society of Agronomy. Agronomy journal. July/Aug 1988. v. 80 (4). p. 631-634. Includes references. (NAL Call No.: DNAL 4 AM34P).

0042

Seed storage studies in field bean (Lablab purpureus (L.) sweet var. lignosus. Prain).
AOSNA. Vanangamudi, K. Karivaratharaju, T.V.; Ramakrishnan, V. S.l. : The Association. The Newsletter of the Association of Official Seed Analysts. Feb 1986. v. 60 (1). p. 78-85. Includes references. (NAL Call No.: DNAL 61.9 AS7N).

0043

Spray timing and economic threshold for the pea aphid Acyrthosiphon pisum (Homoptera: Aphididae), on field peas in Manitoba.
JEENAI. Maiteki, G.A. Lamb, R.J. College Park, Md. : Entomological Society of America. Journal of economic entomology. Dec 1985. v. 78 (6). p. 1449-1454. Includes references. (NAL Call No.: DNAL 421 J822).

0044

Surfactant-induced ethylene production by leaf tissue.
JOSHB. Lownds, N.K. Bukovac, M.J. Alexandria, Va. : The Society. Ethylene evolution induced by nonionic (Triton X-100, Triton X-405, Tween 20, Ortho X-77 and Regulaid), anionic (Aerosol OT and Dupanol ME), and cationic (Arquad C-50 and Arquad 2C-75) surfactants was characterized using cowpea Vigna unguiculata (L.) Walp. supsb. unguiculata 'Dixielee' seedlings. Representative surfactants of each ionogenic class induced ethylene evolution. Time course studies revealed an increased rate of ethylene evolution during the first 6 to 12 hr after treatment, followed by a slow decrease for the next 12 to 36 hr, and a return to control levels within 48 hr. Ethylene production induced by Triton X-100 increased with increasing concentration, while Tween 20 did not induce ethylene at concentrations up to

1.0%. Surfactants that promoted ethylene evolution also generally induced visible phytotoxicity. Phytotoxicity symptoms increased with increasing time after treatment. Surfactant-induced ethylene production and phytotoxicity were observed with corn (Zea mays L. 'B73 x MO17'), wheat (Triticum aestivum L. 'Hillsdale'), soybean (Glycine max Merr. 'McCall'), apple (Malus domestica Borkh. 'Golden Delicious'), and sour cherry (Prunus cerasus L. 'Montmorency'). Tween 20, nonactive on cowpea, induced ethylene and phytotoxicity when applied to the abaxial surface of sour cherry leaves. Chemical names used: octylphenoxypoly(ethoxy)ethanol (Triton X-100 and X-405), polyoxyethylene sorbitan monolaurate (Tween 20), alkylaryl polyoxyethylene glycols/free fatty acids/isopropanol (Ortho X-77), polyoxyethylenepolypropoxypropanol alkyl 2-ethoxyethanol/dihydroxy-propane (Regulaid), diocytl sodium sulfosuccinate (Aerosol OT), sodium lauryl sulfate (Dupanol ME), monococo trimethyl ammonium chloride (Arquad C-50), dicoco dimethyl ammonium chloride (Arquad 2C-75). Journal of the American Society for Horticultural Science. May 1989. v. 114 (3). p. 449-454. Includes references. (NAL Call No.: DNAL 81 SO12).

0045

Vegetable abundance: from yardlong cowpeas to bitter melons.
Wittwer, S. East Lansing : Michigan State University Press, 1987. Feeding a billion : frontiers of Chinese agriculture / by Sylvan Wittwer ... et al. . p. 253-269. ill. Includes references. (NAL Call No.: DNAL HD2098.F45).

0046

Yield and plant nutrient content of vegetables trickle-irrigated with municipal wastewater.
HJHSA. Neilsen, G.H. Stevenson, D.S.; Fitzpatrick, J.J.; Brownlee, C.H. Alexandria, Va. : American Society for Horticultural Science. HortScience. Apr 1989. v. 24 (2). p. 249-252. Includes references. (NAL Call No.: DNAL SB1.H6).

0047

Yield reductions in field peas and lentils resulting from volunteer crop competition.
WSWPA. Hornford, R.G. Drew, B.N. Reno : The Society. Proceedings - Western Society of Weed Science. 1985. v. 38. p. 122-125. (NAL Call No.: DNAL 79.9 W52).

0048

Bean yellow mosaic virus isolate that infects peanut (Arachis hypogaea).
PLDRA. Bays, D.C. Demski, J.W. St. Paul, Minn. : American Pnytopathological Society. Plant disease. July 1986. v. 70 (7). p. 667-669. ill. Includes 14 references. (NAL Call No.: DNAL 1.9 P69P).

0049

Better beans. How to protect your beans from stressful temperature swings.
Bilderback, D. Emmaus, Pa. : Rodale Press. Rodale's organic gardening. Aug 1987. v. 34 (8). p. 25-29. ill. (NAL Call No.: DNAL S605.5.R64).

0050

Combinations of sethoxydim (Poast) herbicide with insecticides and a fungicide for snap beans.
Mullins, C.A. Shamiyeh, N.B. Fort Collins, Colo : Howard F. Schwartz, Colorado State University. Annual report of the Bean Improvement Cooperative. 1989. v. 32. p. 83. (NAL Call No.: DNAL SB327.A1B5).

0051

Combining ability analyses and relationships among yield, yield components, and architectural traits in dry bean.
CRPSAY. Nienhuis, J. Singh, S.P. Madison, Wis. : Crop Science Society of America. Crop science. Jan/Feb 1986. v. 26 (1). p. 21-27. Includes 27 references. (NAL Call No.: DNAL 64.8 C883).

0052

Common ragweed interference in snap beans at various soil potassium levels.
AAREEZ. Evanylo, G.K. Zehnder, G.W. New York, N.Y. : Springer. Effects of interference of common ragweed (Ambrosia artemisiifolia L.) and herbicide control (Trifluralin) at various soil K levels on yield and nutrient uptake by snap beans (Phaseolus vulgaris L. "Provider") were investigated in field studies. Trifluralin produced no significant effects upon snap bean dry matter production, fresh market pod yields, or pod nutrient accumulation. Competition from common ragweed from seeding to flowering (30 days) and for the full season (50 days) decreased snap bean pod yields by 30 and75%, respectively. Yield reduction in the presence of common ragweed up to flowering was related to decreased leaf dry matter production. Snap bean pod yields and nutrient accumulation were increased with K fertilization when only full-season weed competition occurred. Potassium fertilizer adjustments based on subsoil K levels may be beneficially applied to snap beans. Applied agricultural research. Spring 1989. v. 4 (2). p. 101-105. Includes references. (NAL Call No.: DNAL S539.5.A77).

0053

Comparisons of Phaseolus acutifolius and Phaseolus vulgaris grown in a semi-arid environment in saline soils.
Goertz, S. Kobriger, J. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. Mar 1986. v. 29. p. 103-104. (NAL Call No.: DNAL SB327.A1B5).

0054

Cowpea.
Waters, L. Jr. St. Paul, Minn. : Center for Alternative Crops and Products, University of Minnesota, 1987? . Grain legumes as alternative crops : a symposium / sponsored by the Center for Alternative Crops and Products, University of Minnesota, July 23-24, 1987. p. 97-101. Includes references. (NAL Call No.: DNAL SB317.L43G73).

0055

Cowpea history, production, and research in Mississippi.
TAEMA. Hare, W.W. College Station, Tex. : The Station. Miscellaneous publication MP - Texas Agricultural Experiment Station. In the series analytic: Cowpea production and research--historical and current perspectives / edited by J. Creighton Miller, Jr. Proceedings of a Workshop, held February 5, 1979, New Orleans, Louisiana. Feb 1988. (1639). p. 16-18. (NAL Call No.: DNAL 100 T31M).

0056

Cowpea seed testing at the Federal Seed Laboratory.
HJHSA. Young, R.W. Alexandria, Va. : American Society for Horticultural Science. HortScience. Includes abstract. Oct 1989. v. 24 (5). p. 756. (NAL Call No.: DNAL SB1.H6).

0057

Cyanazine residues on fieldbeans (Phaseolus vulgaris) as a replant crop.
WETEE9. Wilson, R.G. Champaign, Ill. : The Society. Weed technology : a journal of the Weed Science Society of America. Jan 1988. v. 2 (1). p. 28-30. Includes references. (NAL Call No.: DNAL SB610.W39).

0058

Development of a Phaseolus crop simulation model.
Hoogenboom, G. Jones, J.W.; White, J.W.; Boote, K.J. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1987. v. 30. p. 34-35. Includes references. (NAL Call No.: DNAL SB327.A1B5).

0059

Dry bean response to water stress.
Yonts, C.D. Nuland, D.S.; Nelson, L.A. St. Joseph, Mich. : The Society. American Society of Agricultural Engineers (Microfiche collection). Paper presented at the 1985 Winter Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St. Joseph, Michigan 49085. Telephone the Order Dept. at (616) 429-0300 for information and prices. 1985. (fiche no. 85-2600). 14 p. ill. Includes references. (NAL Call No.: DNAL FICHE S-72).

0060

The effect of added nitrogen on biomass and the incidence of white mold from two on-farm research trials. 1988.
Nuland, D. Schild, J.; Anderson, F. Fort Collins, Colo : Howard F. Schwartz, Colorado State University. Annual report of the Bean Improvement Cooperative. 1989. v. 32. p. 109-110. (NAL Call No.: DNAL SB327.A1B5).

0061

Effect of chlordimeform on tarnished plant bug (Heteroptera: Miridae) nymph emergence.
JEENAI. Bailey, J.C. Cathey, G.W. College Park, Md. : Entomological Society of America. Journal of economic entomology. Dec 1985. v. 78 (6). p. 1485-1487. Includes references. (NAL Call No.: DNAL 421 J822).

0062

The effect of different dry bean growth habits on yield stability.
Kelly, J.D. Varner, G.V.; Adams, M.W. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. Mar 1986. v. 29. p. 58-59. Includes references. (NAL Call No.: DNAL SB327.A1B5).

0063

Effect of fungicide seed treatment and Rhizobium inoculation on chickpea production.
AAREEZ. Welty, L.E. Prestbye, L.S.; Hall, J.A.; Mathre, D.E.; Ditterline, R.L. New York : Springer. Applied agricultural research. 1988. v. 3 (1). p. 17-20. Includes references. (NAL Call No.: DNAL S539.5.A77).

0064

Effect of harvest date on yield and quality of several snap bean cultivars.
Mullins, C.A. Coffey, D.L. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1987. v. 30. p. 65-66. (NAL Call No.: DNAL SB327.A1B5).

0065

Effect of irrigation on drymatter production and yield of common beans (Phaseolus vulgaris (L.)).
Hoogenboom, G. Jagtap, S.S.; Jones, J.W.; Boote, K.J. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. Mar 1986. v. 29. p. 127-129. Includes references. (NAL Call No.: DNAL SB327.A1B5).

0066

Effect of plant spacing on growth and yield of winged bean.
JAUPA. Lee, C.T. Mayaguez : University of Puerto Rico, Agricultural Experiment Station. The Journal of agriculture of the University of Puerto Rico. Apr 1988. v. 72 (2). p. 273-276. (NAL Call No.: DNAL 8 P832J).

0067

Effect of planting dates on yield and other agronomic traits of dry bean.
NDFRA. Grafton, K.F. Schneiter, A.A. Fargo, N.D. : The Station. North Dakota farm research - North Dakota, Agricultural Experiment Station. May/June 1985. v. 42 (6). p. 11-13. Includes references. (NAL Call No.: DNAL 100 N813B).

0068

Effect of seed size and depth of planting on seedling emergence and yield of two pinto bean cultivars.
Miklas, P.N. Pearson, C.H. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1987. v. 30. p. 77-78. (NAL Call No.: DNAL SB327.A1B5).

0069

Effect of soil pH on crop yield in northern Idaho.
AGJOAT. Mahler, R.L. McDole, R.E. Madison, Wis. : American Society of Agronomy. Agronomy journal. July/Aug 1987. v. 79 (4). p. 751-755. Includes references. (NAL Call No.: DNAL 4 AM34P).

0070

The effect of soil pH on wheat and lentils grown on an agriculturally acidified northern Idaho soil under greenhouse conditions.
CSOSA2. Mohebbi, S. Mahler, R.L. New York, N.Y. : Marcel Dekker. Communications in soil science and plant analysis. Feb 1989. v. 71 (3/4). p. 359-381. Includes references. (NAL Call No.: DNAL S590.C63).

0071

Effects of genotype, plant spacing and intercropping with sorghum on ashy stem blight of cowpeas.
Conniff, K. De Mooy, C.J.; Burke, D.W. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. Mar 1986. v. 29. p. 97. (NAL Call No.: DNAL SB327.A1B5).

0072

Effects of herbicides on root rot of pinto bean, weeds, and two soilborne fungi.
PLDRA. Gilbertson, R.L. Ruppel, E.G.; Schweizer, E.E. St. Paul, Minn. : American Phytopathological Society. Plant disease. July 1987. v. 71 (7). p. 627-629. Includes references. (NAL Call No.: DNAL 1.9 P69P).

0073

Effects of nitrous oxide on artificial aging of bean seeds.
Sowa, S. Roos, E.E.; Manalo, J.R.; Caughey, W.S. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1988. v. 31. p. 154-155. Includes references. (NAL Call No.: DNAL SB327.A1B5).

0074

Effects of plant density and late-season defoliation on yield of field beans.
EVETEX. Capinera, J.L. Horton, D.R.; Epsky, N.D.; Chapman, P.L. College Park, Md. : Entomological Society of America. Environmental entomology. Feb 1987. v. 16 (1). p. 274-280. Includes references. (NAL Call No.: DNAL QL461.E532).

0075

The effects of soil compaction and organic matter on the growth of bush beans.
TAAEA. Ohu, J.O. Raghavan, G.S.V.; McKyes, E.; Stewart, K.A.; Fanous, M.A. St. Joseph, Mich. : The Society. Transactions of the ASAE - American Society of Agricultural Engineers. July/Aug 1985. v. 28 (4). p. 1056-1061. Includes references. (NAL Call No.: DNAL 290.9 AM32T).

0076

Effects of tillage and spacing on snap bean production.
Mullins, C.A. Coffey, D.L. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1987. v. 30. p. 64-65. (NAL Call No.: DNAL SB327.A1B5).

0077

Effects of tillage methods and soil cover crops on yield and leaf elemental concentrations of snap bean.
AAREEZ. Grenoble, D.W. Bergman, E.L.; Orzolek, M.D. New York, N.Y. : Springer. Field studies were conducted in 1981-1983 with snapbeans (Phaseolus vulgaris L.) comparing tillage methods, cover crops and their effects on yield and concentration of nutrients in the plants. No-tillage (NT), strip-tillage (ST), and conventional tillage (CT) were compared in combination with two cover crops, red clover (Trifolium pratense) and rye (Secale cereale), and no soil cover. Yields were greatest with CT methods two out of three years. There was a trend towards higher snap bean yields following either of the cover crops compared to no soil cover; however, only in 1981 did presence of soil cover have a significant effect on yield. Leaf P was lower in crops with CT than with reduced tillage during each year. Leaf Al decreased as tillage decreased. Boron levels were always greater with reduced tillage as compared to CT. Boron concentrations in tissue were lower following rye as compared to red clover or no clover in two of the years. Applied agricultural research. Spring 1989. v. 4 (2). p. 81-85. Includes references. (NAL Call No.: DNAL S539.5.A77).

0078

The effects of winter cover crops on the production of cotton grown on a Norwood very fine sandy loam.
Millhollon, E.P. Beck, A.W. Bossier City, La. : The Station. Annual research report - Red River Research Station. Includes statistical data. 1987. p. 153-162. (NAL Call No.: DNAL 100 L9333).

0079

Estimated losses due to root-knot nematodes, Meloidogyne incognita, and M. javanica in pea crop.
Sharma, G.L. Raleigh, N.C. : Crop Nematode Research & Control Project . International nematology network newsletter. Mar 1989. v. 6 (1). p. 28-29. Includes references. (NAL Call No.: DNAL SB998.N45I5).

0080

Evaluation of the green manure potential of Austrian winter peas in northern Idaho.
AGJOAT. Mahler, R.L. Auld, D.L. Madison, Wis. : American Society of Agronomy. The objective of this field study was to determine the effect of Austrian winter peas Pisum sativum spp. arvense (L.) Poir used as either a green manure (GMP) or seed pea (SP) crop on soil N levels, and yields of subsequent crops of winter wheat (Triticum aestivum L.) and spring barley (Hordeum vulgare L.). The Austrian winter pea-winter wheat-spring barley (GMP-WW-SB) rotation was compared with seed pea-winter wheat-spring barley (SP-WW-SB), spring barley-winter wheat-spring barley (SF-WW-SB) and summer fallow-winter wheat-spring barley (SF-WW-SB) cropping sequences at two sites similar in annual precipitation. After harvest of the initial rotational crop, plots were divided into four subplots and four rates of N were applied as a topdress application following planting of 'Stephens' winter wheat. Spring barley was planted the third year. Winter wheat yields, spring barley yields, and inorganic soil N were not significantly affected by rotation X N fertilizer interactions. Winter wheat yield averages following GMP, SP, SF, and SB were 6.6, 6.4, 6.3, and 4.7 Mg ha-1, respectively. Average N fertilizer equivalent values of 94, 75, and 68 kg ha-1 were provided by GMP, SP, and SF, respectively, to the following winter wheat crop. Yield differences resulting from crop rotation or N fertilization rate were not observed in the third year of the cropping sequence. Austrian winter peas used as either a GMP or SP crop provided more inorganic N for the following winter wheat crop than SF or SB. From a 3-yr total yield the SP-WW-SB was the most efficient cropping sequence, as cereal yields were comparable to the GMP-WW-SB and SF-WW-SB rotations; however, since SP was harvested, three crops instead of two (other rotations) were produced. Agronomy journal. Mar/Apr 1989. v. 81 (2). p. 258-264. Includes references. (NAL Call No.: DNAL 4 AM34P).

0081

Fall-seeded legume cover crops for no-tillage corn in the humid East.
AGJOAT. Holderbaum, J.F. Decker, A.M.; Meisinger, J.J.; Mulford, F.R.; Vough, L.R. Madison, Wis. : American Society of Agronomy. No-tillage systems utilizing winter cover crops can reduce erosion and leaching losses. Fall-seeded legumes can also supply significant amounts of N to subsequent corn (Zea mays L.) crops. The suitability of 14 fall-seeded legumes, three small grains and four legume/grass mixtures was evaluated for winter covers from 1982 through 1985 on Matapeake silt loam (fine-loamy, mixed, mesic, Typic Hapludult) and Mattapex silt (fine-silty, mixed mesic, Aqualfic Normuldult) Coastal Plain soils as well as Delanco silt loam and Chester silt loam (fine-loamy, mixed, mesic, Aquic Hapludult) Piedmont soils. Hairy vetch (Vicia villosa Roth), crimson clover (Trifolium incarnatum L.) and Austrian winter peas Pisum sativum (L.) Poir. were the most promising cover crops. Fall growth and early soil coverage was highest with crimson and lowest with vetch which had higher winter survival and spring growth. Peas and, to a lesser extent, crimson clover stands were damaged in some years by Sclerotinia trifoliorum Eriks. In some years top growth of vetch contained up to 350 kg N/ha. While N concentration varied among species, total N production was determined more by dry matter yield. Legume cover crops had a greater influence on corn grain yields on the heavier textured soils and longer growing season of the Coastal Plain. In 1985, N contribution to the subsequent corn crop was reduced when small grains were seeded with annual legumes. Results from these studies show that winter annual legumes can reduce N costs while providing better soil protection during winter months. Agronomy journal. Jan/Feb 1990. v. 82 (1). p. 117-124. Includes references. (NAL Call No.: DNAL 4 AM34P).

0082

Forage phytomass potential of fababean (Vicia faba L.) under irrigation.
AAREEZ. Lockerman, R.H. Buss, D.A.; Wiesner, L.E.; Westesen, G.L. New York, N.Y. : Springer. A line-source sprinkler irrigation system was used to superimpose a decreasing soil moisture gradient on fababean (Vicia faba L.) at Bozeman and Manhattan, Montana, USA in 1982 and 1984, respectively. Plant height, seed yield, and straw phytomass were evaluated at evapotranspiration (ET) levels ranging from 354 to 540 mm (13.9 to 21.3 in.) in 1982 and 320 to 500 mm in 1984. Moisture had the greatest effect on plant height during the intermediate growth and development stages during both years. Total above-ground phytomass production, as a function of ET levels, ranged from approximately 5 to 11 Mg/ha (4461 to 9814 lb/A) in 1982 and 5 to 10 Mg/ha in 1984. Applied agricultural research. Fall 1989. v. 4 (4). p. 235-239. Includes references. (NAL Call No.: DNAL S539.5.A77).

0083

Growing lima beans.
Turner, J. Strother, G.; Gazaway, W.S.; Patterson, M. Auburn, Ala. : The Service. Circular ANR - Cooperative Extension Service, Auburn University. In subseries: Horticulture. Mar 1988. (215). 4 p. (NAL Call No.: DNAL S544.3.A2C47).

0084

Growth and biomass partitioning in zinc-toxic bush beans.
JPNUDS. Ruano, A. Poschenrieder, C.; Barcelo, J. New York, N.Y. : Marcel Dekker. Journal of plant nutrition. May 1988. v. 11 (5). p. 577-588. Includes references. (NAL Call No.: DNAL QK867.J67).

0085

Heritability, phenotypic correlations, and associations of the common blight disease reactions in beans.
JOSHB. Aggour, A.R. Coyne, D.P. Alexandria, Va. : The Society. Common blight in beans (Phaseolus vulgaris L.) incited by Xanthomonas campestris pv. phaseoli (Smith) Dye (X c p) reduces crop yield and seed quality. The objective of this experiment was to study heritability and phenotypic correlations of the disease reaction to various strains of X c p at several plant developmental stages in specific bean crosses using diverse methods of inoculation. Leaf and pod disease reactions to strains X c p were inherited quantitatively and narrow-sense heritability estimates were low in the following crosses between Phaseolus vulgaris cultivars/lines: Bac-6 (moderately resistant = MR) x NE-EP1 (MR); Bat-862 (MR) x Pompadour Checa' (susceptible = S); Pompadour Checa' (S) x Bac-6 (MR); Venezuela 44' (S) x Bat-862 (MR). Pod disease reaction was not correlated with leaf disease reaction at any growth stage. Low or nonsignificant phenotypic correlations were detected between disease reactions of leaves at the seedling and flowering stages with the several methods of inoculation. Intermediate phenotypic cprrelations were found for disease reactions with three methods of inoculation at the seedling stage, but only with two methods in the flowering stage. Negative or nonsignificant phenotypic correlations were observed between leaf disease reaction and number of days to first flower. Different duplicate recessive genes were found to control two foliar abnormality traits: crippled growth and variegated leaves . No plants with a combination of both traits were observed. An association was found between crippled growth and a high level of resistance to strain V3S8 of Xc p in the cross Bat-862 x Pompadour Checa'. Journal of the American Society for Horticultural Science. Sept 1989. v. 114 (5). p. 828-833. ill. Includes references. (NAL Call No.: DNAL 81 S012).

0086

Implications of year X season X genotype interactions in mungbean yield trials.
JOSHB. Fernandez, G.C.J. Chen, H.K. Alexandria, Va. : The Society. Knowledge of the type and extent of the genotype x environment (G x E) interaction on a particular crop can be applied to improve the efficiency of resource allocation in long-term yield trials. Estimates of the relative magnitude of G x E, for seed yield and related traits, were obtained from mungbean Vigna radiata (L.) Wilezek field trials conducted at the Asian Vegetable Research and Development Center (AVRDC) in Taiwan. Ten diverse genotypes were evaluated in spring, summer, and fall during 2 years. Photoperiod, temperature, and distribution of pest and diseases vary distinctly during these seasons. The sigma (2)G was greater than the sigma (2)GE for plant height, seeds per pod, 100-seed weight, and days to flowering; however, seed yield, first harvest percentage, pods per plant, and mean maturity were greatly influenced by sigma (2)GE.sigma (2)GY was significant for all variables, except seed weight, while sigma (2)GS was significant for plant height, pods per plant, seeds per pod, and days to flowering. The second-order interactions, G x Y x S, were large and greater than the first-order interactions (G x Y, G x S) for seed yield, pods per plant, and seeds per pod. Estimates of expected error variance for genotypic mean from varying years, replications, and three seasons suggest that 3 years and three replications would be effective in selecting promising lines from three-season yield trials conducted at AVRDC. Journal of the American Society for Horticultural Science. Nov 1989. v. 114 (6). p. 999-1002. Includes references. (NAL Call No.: DNAL 81 S012).

0087

Incorporation of crucifer green manures to reduce Aphanomyces root rot of snap beans.
Parke, J.L. Rand, R.E. Fort Collins, Colo : Howard F. Schwartz, Colorado State University. Annual report of the Bean Improvement Cooperative. 1989. v. 32. p. 105-106. Includes references. (NAL Call No.: DNAL SB327.A1B5).

0088

Insecticide evaluation on snap bean, 1984-1988 /Paul McLeod.
McLeod, Paul Jean. Fayetteville, Ark. : Arkansas Agricultural Experiment Station, 1989. "August 1989."-Cover. 5 p. ; 23 cm. (NAL Call No.: DNAL S541.5 .A8R47 no.386).

0089

Inter-varietal competition; the effect of different neighbors on relative yields of Phaseolus vulgaris varieties.
Isom, W.H. Vilchez, M. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. Mar 1986. v. 29. p. 13-14. (NAL Call No.: DNAL SB327.A1B5).

0090

Interactive effects of pot geometry, water management, salinity, and growing medium on growth and yield components of snapbean in the greenhouse.
AGJOAT. Campbell, W.F. Wagenet, R.J.; Jones, A. Madison, Wis. : American Society of Agronomy. Agronomy journal. Sept/Oct 1985. v. 77 (5). p. 707-710. Includes references. (NAL Call No.: DNAL 4 AM34P).

0091

Irrigation management effects on spring pea seed yield and quality.
HJHSA. Raymond, M.A. Stark, J.C.; Murray, G.A. Alexandria, Va. : American Society for Horticultural Science. HortScience. Dec 1987. v. 22 (6). p. 1262-1263. Includes references. (NAL Call No.: DNAL SB1.H6).

0092

Irrigation performance in reduced tillage systems.
Yonts, C.D. Smith, J.A.; Bailie, J.E. St. Joseph, Mich. : The Society. American Society of Agricultural Engineers (Microfiche collection). Paper presented at the 1988 Summer Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St. Joseph, Michigan 49085. Telephone the Order Dept. at (616) 429-0300 for information and prices. 1988. (fiche no. 88-2012). 17 p. Includes references. (NAL Call No.: DNAL FICHE S-72).

0093

Measuring the effect of rust on pinto beans.
Lindgren, D.T. Steadman, J.R.; Schaaf, D.M. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1988. v. 31. p. 100-101. (NAL Call No.: DNAL SB327.A1B5).

0094

Navy bean seed vigor and field performance in relation to microwave radiation.
AGJOAT. Spilde, L.A. Madison, Wis. : American Society of Agronomy. Agronomy journal. Sept/Oct 1987. v. 79 (5). p. 827-830. Includes references. (NAL Call No.: DNAL 4 AM34P).

0095

NF-10 bioactivators enhance photosynthesis, plant growth, yield and quality in commercial crops.
PPGGD. Tenzer, A.I. Lake Alfred, Fla. : The Society. Proceedings annual meeting - Plant Growth Regulator Society of America. 1987. (14th). p. 316-325. Includes references. (NAL Call No.: DNAL SB128.P5).

0096

Nutrient and sensory properties of dry beans (Phaseolus vulgaris L.) grown under various cultural conditions.
JFDAZ. Koehler, H.H. Burke, D.W. Chicago, Ill. : The Institute. Dry beans UI-114 (Pinto) and Rufus (Red Mexican) were field-grown under presence or absence of Fusarium root rot, drought or optimum water, low or high nitrogen fertilization. Raw bean powder was analyzed chemically for proximate composition, minerals, vitamins and amino acids, and by Tetrahymena pyriformis W for protein quality. Cooked beans underwent sensory evaluation. Protein content of raw beans generally varied inversely with irrigation. Rufus beans combined significantly more thiamin than comparable UI-114 beans. High-N non-diseased soils produced beans with methionine concentrations greater than those from low-N Fusarium-infected soils. Pinto UI-114 beans were rated significantly more acceptable than Rufus beans (P less than 0.001). Journal of food science : an official publication of the Institute of Food Technologists. July/Aug 1988. v. 53 (4). p. 1135-1138, 1198. Includes references. (NAL Call No.: DNAL 389.8 F7322).

0097

Performance of mungbean, cowpea, and soybean cut for greenchop, silage, and hay and effects of seed inoculation on forage yield and quality.
Morris, D.R. Nelson, D.B.; Friesner, D.L.; Barber, B.W. Baton Rouge? , La. : The Station. Annual progress report - Southeast Research Station, Louisiana Agricultural Experiment Station. 1988. p. 43-47. (NAL Call No.: DNAL S67.E22).

0098

Performance of mungbean, cowpea, and soybean cut for greenchop, silage, and hay and effects of seed inoculation on forage yield, 1987.
Morris, D. Friesner, D.; Mason, L. Franklinton, La. : The Station. Annual progress report - Southeast Research Station, Louisiana Agricultural Experiment Station. Includes statistical data. 1987. p. 51-56. (NAL Call No.: DNAL S67.E22).

0099

Postemergence weed control in pigeon peas with glyphosate shielded treatments.
JAUPA. Semidey, N. Almodovar, L.; Orengo-Santiago, E. Mayaguez : University of Puerto Rico, Agricultural Experiment Station. The Journal of agriculture of the University of Puerto Rico. Oct 1987. v. 71 (4). p. 359-364. Includes references. (NAL Call No.: DNAL 8 P832J).

0100

Production, insect and weed considerations with dry peas, lentils, chickpeas and faba beans.
Muehlbauer, F.J. St. Paul, Minn. : Center for Alternative Crops and Products, University of Minnesota, 1987? . Grain legumes as alternative crops : a symposium / sponsored by the Center for Alternative Crops and Products, University of Minnesota, July 23-24, 1987. p. 133-150. ill. Includes references. (NAL Call No.: DNAL SB317.L43G73).

0101

Production practices and constraints to expansion of field beans in the region.
Hardman, L.L. St. Paul, Minn. : Center for Alternative Crops and Products, University of Minnesota, 1987? . Grain legumes as alternative crops : a symposium / sponsored by the Center for Alternative Crops and Products, University of Minnesota, July 23-24, 1987. p. 119-124. (NAL Call No.: DNAL SB317.L43G73).

0102

Quality control at the grower level.
Prentice, R. Washington, D.C. : Food Processors Institute, c1985. Proceedings / Technical Conference on Dry Bean Research, February 13, 1985, San Francisco, California. p. 27. (NAL Call No.: DNAL TP444.B38T43 1985).

0103

Reciprocal effect of peas and oats for fodder in combined crops.
Proskura, I.P. Dverenina, O.T. New York, N.Y. Allerton Press. Soviet agricultural sciences. Translated from: Vsesoyuznaia Akademiia Sel'skokhozyaistvennykh Nauk, Doklady, (12), 1988, p. 15-17. (20 AK1). 1988. (12). p. 23-26. Includes references. (NAL Call No.: DNAL S1.S68).

0104

Relationship between grain yield and carbon isotope ratio (13C/12C) in dry beans.
Brick, M.A. Ehleringer, J.R.; Zacharisen, M.; Fisher, A.G. Fort Collins, Colo : Howard F. Schwartz, Colorado State University. Annual report of the Bean Improvement Cooperative. 1989. v. 32. p. 38. Includes references. (NAL Call No.: DNAL SB327.A1B5).

0105

The response of beans (Phaseolus vulgaris L.) to phorate treatments during rainy and dry season plantings.
Barrigossi, J.A.F. Chandler, L.; Lopes, N.F. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1988. v. 31. p. 157-158. (NAL Call No.: DNAL SB327.A1B5).

0106

Rhizoctonia root rot in snap bean following corn with conservation tillage.
Win, H.H. Sumner, D.R. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1988. v. 31. p. 119-120. (NAL Call No.: DNAL SB327.A1B5).

0107

Short term storage effects on dormancy and germination of chickpea (Cicer arietinum).
JSTED. Frisbee, C.C. Smith, C.W.; Wiesner, L.E.; Lockerman, R.H. East Lansing, Mich. Association of Official Seed Analysts. Journal of seed technology. 1988. v. 12 (1). p. 16-23. Includes references. (NAL Call No.: DNAL SB113.2.J6).

0108

Soil compaction losses in pinto beans.
Croissant, R.L. Schwartz, H.F.; Ayers, P.D. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1988. v. 31. p. 58-59. Includes references. (NAL Call No.: DNAL SB327.A1B5).

0109

Source-sink relationship in a climbing pole bean (Phaseolus vulgaris L.): its effect on yield.
Madrid Cruz, M. Kohashi-Shibata, J. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1988. v. 31. p. 174-175. (NAL Call No.: DNAL SB327.A1B5).

0110

Source-sink relationships in an indeterminate bush bean (Phaseolus vulgaris L.).
Martinez-Villegas, E. Kohashi-Shibata, J. Fort Collins, Colo : Howard F. Schwartz, Colorado State University. Annual report of the Bean Improvement Cooperative. 1989. v. 32. p. 31. (NAL Call No.: DNAL SB327.A1B5).

0111

Systems approach to weed management in irrigated crops.
WEESA6. Schweizer, E.E. Lybecker, D.W.; Zimdahl, R.L. Champaign, Ill. : Weed Science Society of America. The impact of four weed management systems on weed seed reserves in soil, yearly weed problem, and production of barley, corn, pinto bean, and sugarbeet was assessed where these crops were grown in rotation for 4 consecutive years in four cropping sequences. Weeds were controlled in each crop with only conventional tillage or conventional tillage plus minimum, moderate (system 1), and intensive (system 2) levels of herbicides. Seed of annual weeds from 11 genera were identified, with barynyardgrass and redroot pigweed comprising 66 and 19%, respectively, of the initial 90 million weed seed/ha present in the upper 25 cm of the soil profile. After the fourth cropping year, overall decline in the total number of weed seed in soil was 53% when averaged over four cropping sequences and four weed management systems. Over the 4-yr period, about 10 times more weeds escaped control in system 1 than in system 2; and within a crop, the fewest number of weeds escaped control annually in barley. System 2 had the highers herbicide use in each cropping sequence, the fewest weeds at harvest, and the smallest adjusted gross return over the 4-yr period in three of four cropping sequences. Weed science. Nov 1988. v. 36 (6). p. 840-845. Includes references. (NAL Call No.: DNAL 79.8 W41).

0112

Temperature and photoperiod influence reproductive development of reduced-photoperiod-sensitive mungbean genotypes.
JOSHB. Fernandez, G.C.J. Chen, H.K. Alexandria, Va. : The Society. Using the 9th and 10th International Mungbean Nursery (IMN) data, quadratic response surface models were developed to predict days to flowering (DF) of mungbean Vigna radiata (L.) Wilczek genotypes grown at 11-hr and 30 min and 13-hr and 30-min preflowering mean photoperiod and 22 to 30C mean diurnal temperature regimes. Both linear and quadratic effects were significant on DF and onthe rate of progress towards flowering (1/DF); however, only the linear effect was significant in days to maturity (DM). The effect of mean diurnal temperature was more pronounced than that of mean photoperiod on DF of reduced-photoperiod-sensitive (RPS) genotypes. The earliest DF (flowering tendency) was estimated at 34 days after planting at the optimum mean diurnal temperature of 28C and the optimum mean photoperiod of 12 hr. At the suboptimal temperature (mean diurnal temperature less than optimum mean diurnal temperature), the estimates of the base temperature Tb and the thermal time theta(r) were 10C and 555 degree-days, respectively. Thus, flowering dates of these RPS mungbean lines can be predicted, which in turn will assist in the selection of proper planting dates. Journal of the American Society for Horticultural Science. Mar 1989. v. 114 (2). p. 204-209. Includes references. (NAL Call No.: DNAL 81 SO12).

0113

United States standards for whole dry peas, split peas, and lentils /United States Department of Agriculture, Federal Grain Inspection Service.
United States.~Federal Grain Inspection Service. Washington, D.C. : The Service, 1989 . "Effective date whole dry peas 1-18-89, split peas 1-18-89, lentils 8-01-88.". 1 v. (various pagings) ; 28 cm. Includes bibliographical references. (NAL Call No.: DNAL aSB343.U5).

0114

Using straw in steep furrows to reduce soil erosion and increase dry bean yields.
JSWCA3. Brown, M.J. Kemper, W.D. Ankeny, Iowa : Soil Conservation Society of America. Journal of soil and water conservation. May/June 1987. v. 42 (3). p. 187-191. ill. Includes references. (NAL Call No.: DNAL 56.8 J822).

0115

Water management effects on biomass production and seed yield of Phaseolus vulgaris (L).
Mahamadou, S. Hoogenboom, G.; Bennett, J.M.; Boote, K.J.; Jones, J.W. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1987. v. 30. p. 36-37. (NAL Call No.: DNAL SB327.A1B5).

0116

White mold control programs on irrigated dry beans.
Varner, G. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. Mar 1986. v. 29. p. 56-57. (NAL Call No.: DNAL SB327.A1B5).

0117

Yield reductions in field peas and lentils resulting from volunteer crop competition.
WSWPA. Hornford, R.G. Drew, B.N. Reno : The Society. Proceedings - Western Society of Weed Science. 1985. v. 38. p. 122-125. (NAL Call No.: DNAL 79.9 W52).

0118

Dehydration effects on seedling development of four range species.
JRMGA. Bassiri, M. Wilson, A.M.; Grami, B. Denver, Colo. : Society for Range Management. Journal of range management. Sept 1988. v. 41 (5). p. 383-386. Includes references. (NAL Call No.: DNAL 60.18 J82).

0119

Acid precipitation effects on growth and yield responses of twenty soybean and twelve snap bean cultivars.
JEVQAA. Reddy, M.R. Madison, Wis. : American Society of Agronomy. Greenhouse studies were conducted to determine the effects of simulated acid precipitation on growth, yield, and nutrient content of soybean Glycine max (L.) Merr. and snap bean (Phaseolus vulgaris L.). Twenty cultivars of soybean and twelve cultivars of snap bean were grown in pots and treated with simulated precipitation at pH 2.5, 3.5, 4.5, or 5.6 (control). Soybean and snap bean plants were treated with simulated precipitation once a week beginning until fruit maturity. Soybean plants showed leaf scorching and yellowing of leaves at pH 2.5 and 3.5, whereas snap bean did not show any visible symptoms. Soybean and snap bean cultivars responded differently to acid precipitation treatments. 'McNair 700' and 'Pioneer 5482' soybean and 'Commodore' bush and 'Provider' bush snap bean cultivars yields were decreased significantly under acid treatments. Eighteen soybean and 10 snap bean cultivars were unaffected. In general, aid precipitation treatments resulted in a greater number of soybean pods without seed compared to the control. Treatments at pH 3.5 and 2.5 affected soybean and snap bean growth and yield more than the other pH levels. Potassium content of soybean shoot decreased significantly under acid precipitation treatments, whereas Ca, Mg, and micronutrient contents were not affected by low pH treatment. Nutrient content of snap bean was unaffected by acidity. Journal of environmental quality. Apr/June 1989. v. 18 (2). p. 145-148. Includes references. (NAL Call No.: DNAL QH540.J6).

0120

Antibiosis effects of wild dry bean accessions on the Mexican bean weevil and the bean weevil (Coleoptera: Bruchidae).
JEENAI. Cardona, C. Posso, C.E.; Kornegay, J.; Valor, J.; Serrano, M. Lanham, Md. : Entomological Society of America. High levels of antibiosis resistance to the Mexican bean weevil (MBW), Zabrotes subfasciatus (Boheman), and the bean weevil (BW), Acanthoscelides obtectus (Say), in wild dry bean, Phaseolus vulgaris L., accessions were caused primarily by high mortality of late first instars and, to a lesser extent, by high mortality of early second instars, coupled with a significant prolongation of the duration of the first instar. Antibiosis had a significant effect on the fecundity of F1 females reared on resistant varieties. Seed integument did not appear to act as a barrier for larvae of the bean weevil. Rearing of both insects on "artificial" seeds further demonstrated that factors responsible for resistance are present in the cotyledons. Journal of economic entomology. Feb 1989. v. 82 (1). p. 310-315. Includes references. (NAL Call No.: DNAL 421 J822).

0121

Association between BCMV resistant I gene and eye color of cultivar Steuben.
Park, S.J. Tu, J.C. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. Mar 1986. v. 29. p. 4-5. Includes references. (NAL Call No.: DNAL SB327.A1B5).

0122

Better beans. How to protect your beans from stressful temperature swings.
Bilderback, D. Emmaus, Pa. : Rodale Press. Rodale's organic gardening. Aug 1987. v. 34 (8). p. 25-29. ill. (NAL Call No.: DNAL S605.5.R64).

0123

Boron tolerance of snap bean and cowpea.
JOSHB. Francois, L.E. Alexandria, Va. : The Society. The effect of excess B in the soil solution on snap bean (Phaseolus vulgaris L.) and cowpea Vigna unguiculata (L.) Walp. was determined in large, outdoor sand tanks. Boron treatments were imposed by irrigation with culture solutions than contained 0.5, 1.0, 3.0, 6.0, 9.0, or 12.0 mg B/liter for snap bean; and 1.0, 2.0, 3.0, 4.0, 6.0, or 8.0 mg B/liter for cowpea. Relative pod yield of snap bean was reduced 12.1% and cowpea seed yield was reduced 11.5% with each unit (mg.liter-1) increase in soil solution B (Bsw) greater than 1.0 and 2.5 mg B/liter, respectively. Reduced yield of snap bean pods and cowpea seeds was attributed primarily to a reduction in pod number. Increasing Bsw significantly reduced plant size of both species. Journal of the American Society for Horticultural Science. July 1989. v. 114 (4). p. 615-619. Includes references. (NAL Call No.: DNAL 81 S012).

0124

Breeding for heat tolerance--an approach based on whole-plant physiology.
HJHSA. Hall, A.E. Alexandria, Va. : American Society for Horticultural Science. HortScience. Paper presented at the "Symposium on Plant-Environment Interactions from Subcellular to Plant Community," August 13, 1986, Davis, California. Jan 1990. v. 25 (1). p. 17-18. Includes references. (NAL Call No.: DNAL SB1.H6).

0125

Bruchid resistance in cowpea.
CRPSAY. Singh, B.B. Singh, S.R.; Adjadi, O. Madison, Wis. : Crop Science Society of America. Crop science. Sept/Oct 1985. v. 25 (5). p. 736-739. ill. Includes references. (NAL Call No.: DNAL 64.8 C883).

0126

Characterization of root agravitropism induced by genetic, chemical, and developmental constraints.
AJBOA. Moore, R. Fondren, W.M.; Marcum, H. Baltimore, Md. : Botanical Society of America. American journal of botany. Mar 1987. v. 74 (3). p. 329-336. ill. Includes references. (NAL Call No.: DNAL 450 AM36).

0127

Chickpea evaluation for cold tolerance under field conditions.
CRPSAY. Singh, K.B. Malhotra, R.S.; Saxena, M.C. Madison, Wis. : Crop Science Society of America. Chickpea (Cicer arietinum L.) yields are higher when plantings are made in early winter in the Mediterranean region instead of during the traditional spring season, but winter killing is often a problem. Cold tolerant chickpea cultivars are needed to sucessfully utilize a winter sowing approach. A study was conducted at the International Center for Agricultural Research in Dry Areas (ICARDA), Tel Hadya, Syria during 1982 to 1983 with the objective of developing a field screening technique for cold tolerance in chickpea, and to identify sources of tolerance. A set of previously identified tolerant, intermediate, and susceptible lines was sown from mid-fall to early spring. All susceptible lines sown during October were killed from cold injury, showing that the crop was more susceptible at the late vegetative stage than at the seedling stage. Consequently, a field screening technique was proposed, with an October sowing date to allow the crop to grow to the late vegetative stage before the onset of severe winter. Susceptible checks are grown at frequent intervals and evaluation takes place after the death of the susceptible check. This is followed by confirmation of tolerance. A 1 to 9 visual score was used to evaluate germplasm for cold tolerance. A total of 3276 germplasm accessions and breeding lines were evaluated form 1981 to 1987. Twenty-one lines were identified as tolerant. Cold tolerance was not associated with the phenotypic traits of leaflet area, seed size, time to maturity, plant height, or growth habit. Crop science. Mar/Apr 1989. v. 29 (2). p. 282-285. Includes references. (NAL Call No.: DNAL 64.8 C883).

0128

Clustering and conservation of genes controlling the interactions of Pseudomonas syringae pathovars with plants.
Panopoulos, N.J. Lindgren, P.B.; Willis, D.K.; Peet, R.C. Cold Spring Harbor, N.Y. : Cold Spring Harbor Laboratory, 1985. Plant cell/cell interactions / edited by Ian Sussex ... et al. . Paper presented at a meeting on the topic of plant cell/cell interactions at the Banbury Conference Center of Cold Spring Harbor Laboratory, New York, October 2-4, 1985. p. 69-75. Includes references. (NAL Call No.: DNAL QK725.P552).

0129

Combining ability analyses and relationships among yield, yield components, and architectural traits in dry bean.
CRPSAY. Nienhuis, J. Singh, S.P. Madison, Wis. : Crop Science Society of America. Crop science. Jan/Feb 1986. v. 26 (1). p. 21-27. Includes 27 references. (NAL Call No.: DNAL 64.8 C883).

0130

Comparative leaf morphology of field beans resistant and susceptible to air pollutant ozone.
Baker, D. Rangappa, M.; Benepal, P.S. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1988. v. 31. p. 106-107. Includes references. (NAL Call No.: DNAL SB327.A1B5).

0131

Comparison of ozone symptom expression among plant introductions of Phaseolus vulgaris L. between laboratory and field studies.
Chappelka, A.H. Rangappa, M.; Robbins, E.; Benepal, P.S. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1987. v. 30. p. 74-75. Includes references. (NAL Call No.: DNAL SB327.A1B5).

0132

Comparison of TTC and electrical conductivity heat tolerance screening techniques in Phaseolus.
HJHSA. Schaff, D.A. Clayberg, C.D.; Milliken, G.A. Alexandria, Va. : American Society for Horticultural Science. HortScience. Aug 1987. v. 22 (4). p. 642-645. Includes references. (NAL Call No.: DNAL SB1.H6).

0133

Cowpea control in soybeans with chlorimuron ethyl and DPX-M6316.
SWSPBE. Jones, J.D. Gossett, B.J.; Harris, J.R.; Toler, J.E. Raleigh, N.C. : The Society . Proceedings - Southern Weed Science Society. Paper presented at the "Meeting on Environmental Legislation and its Effects on Weed Science," Jan 18/20, 1988, Tulsa, Oklahoma. 1988. v. 41. p. 49. (NAL Call No.: DNAL 79.9 S08 (P)).

0134

Cowpea seed testing at the Federal Seed Laboratory.
HJHSA. Young, R.W. Alexandria, Va. : American Society for Horticultural Science. HortScience. Includes abstract. Oct 1989. v. 24 (5). p. 756. (NAL Call No.: DNAL SB1.H6).

0135

Defense genes in bean seedlings: induction of chitinase by ethylene.
Gaynor, J.J. Broglie, R. New York : Alan R. Liss. UCLA symposia on molecular and cellular biology. Paper presented at the "Symposium on Plant Genetics," April 13-19, 1985, Keystone, Colorado. 1985. v. 35. p. 617-627. ill. Includes references. (NAL Call No.: DNAL QH506.U34).

0136

Deleterious effects of white seed due to p gene in beans.
JOSHB. Dickson, M.H. Petzoldt, R. Alexandria, Va. : The Society. Journal of the American Society for Horticultural Science. Jan 1988. v. 113 (1). p. 111-114. Includes references. (NAL Call No.: DNAL 81 S012).

0137

Differences in seed physical & chemical characteristics of two dry bean isolines.
Carpenter, W.J. Hosfield, G.L.; Uebersax, M.A. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1988. v. 31. p. 30-31. Includes references. (NAL Call No.: DNAL SB327.A1B5).

0138

Differential response of fourteen plant introductions of Phaseolus vulgaris L. to ozone in the field.
Chappelka, A.H. Rangappa, M.; Gross, P.; Benepal, P.S. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1987. v. 30. p. 72-73. Includes references. (NAL Call No.: DNAL SB327.A1B5).

0139

Drought resistance in bean (Phaseolus vulgaris L.).
Guimaraes, C.M. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. Mar 1986. v. 29. p. 130-131. (NAL Call No.: DNAL SB327.A1B5).

0140

Dynamics of imbibition in Phaseolus vulgaris L. in relation to initial seed moisture content.
PLPHA. Wolk, W.D. Dillon, P.F.; Copeland, L.F.; Dilley, D.R. Rockville, Md. : American Society of Plant Physiologists. The seed moisture level marking the onset of imbibitional injury (breakpoint) was determined for two cultivars of Phaseolus vulgaris L. cv 'Tendercrop' (TC) and 'Kinghorn Wax' (KW). At 20 degrees C the breakpoints were 0.15 gram H2O/gram dry weight (gram per gram) for TC and 0.11 gram per gram for KW. When seeds were imbibed at 5 degrees C, the breakpoints were 0.19 gram per gram (TC) and 0.16 gram per gram (KW). Below the breakpoint germination changed 4.6%/0.01 gram per gram for all treatments. Imbibition rates were maximal at 0.07 gram for all treatments. Imbibition rates were maximal at 0.07 gram per gram and 0.33 gram per gram after 20 minutes imbibition. Rates of electrolyte leakage were correlated with the imbibition rate maximum at 0.07 gram per gram but were unaffected by the maximum at 0.33 gram per gram. The transition from tightly bound to semibound water occurred at 0.09 gram per gram and 0.11 gram per gram for KW and TC, respectively. T1 values increased exponentially as seed moisture decreased from 0.47 gram per gram to 0.05 gram per gram. 13C-NMR sugar signals increased at moisture levels above 0.14 gram per gram and plateaued at approximately 0.33 gram per gram seed moisture. These results suggest that the breakpoint moisture level for imbibitional damage is a function of temperature while the injury process is similar at both 5 and 20 degrees C. Imbibition and leakage rate maxima reflect transitions in the states of seed water. NMR data support the application of the Water Replacement Hypothesis to seeds. Thus, imbibitional injury may be related to specific, temperature dependent moisture levels that are determined by water binding characteristics in the seed tissue. Plant physiology. Mar 1989. v. 89 (3). p. 805-810. Includes references. (NAL Call No.: DNAL 450 P692).

0141

Effect of date of planting on seed coat cracking, adhesion and internal morphology of seed coat to cotyledon of dry beans (Phaseolus vulgaris).
Bailie, J.E. Coyne, D.P.; Paparozzi, E.T.; Hanna, M.A. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. Mar 1985. v. 28. p. 58-59. (NAL Call No.: DNAL SB327.A1B5).

0142

The effect of inoculation methods, pathogenic variability and inoculum concentrations on reactions and genetics of resistance to isolates of Xanthomonas campestris P.V. pasheoli in leaves and pods of dry beans (Phaseolus vulgaris L.).
Leyna, H. Coyne, D.P. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the

Bean Improvement Cooperative. Mar 1985. v. 28. p. 70-71. (NAL Call No.: DNAL SB327.A1B5).

0143

The effect of leaf developmental stage on the variation of resistant and susceptible reactions of phaseolus vulgaris to Uromyces appendiculatus.
PHYTA. Shaik, M. Steadman, J.R. St. Paul, Minn. : American Phytopathological Society. The effect of leaf developmental stage of beans (Phaseolus vulgaris) at the time of inoculation on the expression of various reactions to rust (Uromyces appendiculatus) was investigated. The areas of uredinia, fungal colonies, and secondary uredinia were negatively correlated with leaf age or leaf length at the time of inoculation, in the most susceptible reaction (large uredinia). These three susceptibility parameters were all positively correlated with each other. In the reaction of smaller uredinia surrounded by necrosis, the percentage of uredinia surrounded by necrosis and fungal colony areas were negatively correlated, whereas uredinial area was positively correlated with leaf developmental stage at the time of inoculation. The effect of leaf developmental stage on uredinial area in this reaction was thus the opposite of that observed for large uredinia. However, the covariate (leaf age)-adjusted means of uredinial and fungal colony areas were significantly lower in the smaller uredinial reaction than those in the large uredinial reaction. In highly resistant reactions (immunity and necrotic spots), leaf age effects were not apparent. Based on these results, several recommendations are made for studying resistance manifested by small uredinia. Phytopathology. Oct 1989. v. 79 (10). p. 1028-1035. ill. Includes references. (NAL Call No.: DNAL 464.8 P56).

0144

Effect of pure and mixed suspensions of virulent and heterologous isolates of Xanthomonas campestris on the infectivity of the inoculum on two species of Phaseolus.
JAUPA. Zapata, M. Mayaguez : University of Puerto Rico, Agricultural Experiment Station. The Journal of agriculture of the University of Puerto Rico. Apr 1985. v. 69 (2). p. 191-199. Includes references. (NAL Call No.: DNAL 8 P832J).

0145

Effect of seed size and depth of planting on seedling emergence and yield of two pinto bean cultivars.
Miklas, P.N. Pearson, C.H. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1987. v. 30. p. 77-78. (NAL Call No.: DNAL SB327.A1B5).

0146

Effects of genotype, plant spacing and intercropping with sorghum on ashy stem blight of cowpeas.
Conniff, K. De Mooy, C.J.; Burke, D.W. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. Mar 1986. v. 29. p. 97. (NAL Call No.: DNAL SB327.A1B5).

0147

Effects of inoculation rate, rhizobial strain competition, and nitrogen fixation in chickpea.
AGJOAT. Somasegaran, P. Hoben, H.J.; Gurgun, V. Madison, Wis. : American Society of Agronomy. Chickpea (Cicer arietinum L.) is the third most widely cultivated legume in the world, but N-fixation studies addressing its inoculation response and rhizobial strain competition are limited. We investigated N fixation and competition by three strains of chickpea Rhizobium (TAL numbers 480, 620, and 1148) on 'Desi' and 'Kabuli' chickpea genotypes grown in vermiculite and two soils (Ultisol and Oxisol) free of chickpea rhizobia. Chickpea grown in vermiculite was inoculated with single and mixed strains. A three-strain mixture was inoculated at 10, 10(2), 10(4), 10(6), and 10(8) rhizobia per seed on seeds planted in the two soils. Nodulation and N-fixing parameters were significantly different for chikcpea genotypes and rhizobial strains, with no genotype X strain interaction in the vermiculite experiment. TAL 620 was the most competitive strain in both chickpea genotypes. Maximum N fixation in both genotypes was achieved at 10(4) and 10(6) rhizobia per seed in the Ultisol and Oxisol, respectively. Nitrogen fixation by chickpea in response to different inoculation rates was best described by a quadratic model. The three strains of Rhizobium competed differently in the two soils. Competition in the Ultisol was due to significant strain differences and genotype X strain interaction. In the Oxisol, there was no strain competition. Different inoculation rates did not influence strain competition. In general, the Kabuli genotype had a greater N-fixing potential than the Desi. Maximum N fixation in the two soils was a function of the different inoculation rates for both genotypes. Competition among chickpea rhizobia was influenced by the growth medium, chickpea genotypes, and strain differences but not inoculation rates. Agronomy journal. Jan/Feb 1988. v. 80 (1). p. 68-73. Includes references. (NAL Call No.: DNAL 4 AM34P).

0148

Effects of plant morphology and emergence time on size hierarchy formation in experimental populations of two varieties of cultivated peas (Pisum sativum).
AJBOAA. Ellison, A.M. Rabinowitz, D. Columbus, Ohio : Botanical Society of America. American journal of botany. Mar 1989. v. 76 (3). p. 427-436. ill. Includes references. (NAL Call

No.: DNAL 450 AM36).

0149

Effects of the genetic suppression of phaseolin and lectin proteins on agronomic characteristics of the common bean, Phaseolus vulgaris L.
Burow, M. Bliss, F.A. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1988. v. 31. p. 176-177. Includes references. (NAL Call No.: DNAL SB327.A1B5).

0150

Elicitation of disease resistance in plants by the expression of latent genetic information.
ACSMC. Salt, S.D. Kuc, J. Washington, D.C. : The Society. ACS Symposium series - American Chemical Society. 1985. (276). p. 47-68. Includes references. (NAL Call No.: DNAL QD1.A45).

0151

Evaluation of cyanide contents in the primary gene pool of the lima bean, Phaseolus lunatus L.
Baudoin, J.P. Barthelemy, J.P.; Agneessens, R.; Maquet, A. Fort Collins, Colo : Howard F. Schwartz, Colorado State University. Annual report of the Bean Improvement Cooperative. 1989. v. 32. p. 60-61. Includes references. (NAL Call No.: DNAL SB327.A1B5).

0152

Field comparison of dinitrogen fixation determined with nitrogen-15-depleted and nitrogen-15-enriched ammonium sulfate in selected inbred backcross lines of common bean.
CRPSAY. St Clair, D.A. Wolyn, D.J.; DuBois, J.; Burris, R.H.; Bliss, F.A. Madison, Wis. : Crop Science Society of America. The field determination of N2 fixation by 15N-isotopic methods provides a direct and precise measure of N2 fixation. Since 15N-enriched fertilizers are expensive, 15N-depleted (NH4)2SO4 was used as a more economical, readily available alternative to determine N2 fixation in common bean, Phaseolus vulgaris L. The objectives of this study were to determine whether 15N-depleted (NH4)2SO4 provided reliable estimates of relative differences in N2 fixation among bean lines comparable to those obtained using 15N-enriched (NH4)2SO4, and whether nine previously selected progeny lines differed from their respective recurrent parents for N2 fixation ability. The nine progeny lines and three parents were grown in two randomized complete block field experiments that were treated identically except that each experiment received only one of the 15N fertilizers. Lines were harvested at an early reproductive stage (R3) and maturity (R9), partitioned into plant parts, and the 15N and total N yield of the tissue determined. The two 15N fertilizers produced comparable differences among lines at R9 stage based on significant genotypic rank correlations between the two experiments, and similar fertilizer use efficiency values (% FUE). Three of the five selected progeny lines from population 24 fixed significantly more N2 than their recurrent parent 'Sanilac'. The four progeny lines from population 21 were not significantly different from or less effective in N2 fixation than their recurrent parent 'Porrillo Sintetico' therefore, either previous selection based on indirect measures of N2 fixation was not effective, or the two parents did not differ genetically for N2 fixation. In all progeny and parental lines, seed N2 fixed was positively rank correlated with plant N2 fixed, and the highest N2-fixing lines in both populations had more fixed N2 in the seeds than did low N2-fixing lines. Crop science. Sept/Oct 1988. v. 28 (5). p. 773-778. Includes references. (NAL Call No.: DNAL 64.8 C883).

0153

Field measurement of white mold effects upon dry beans with genetic resistance or upright plant architecture.
CRPSAY. Schwartz, H.F. Casciano, D.H.; Asenga, J.A.; Wood, D.R. Madison, Wis. : Crop Science Society of America. Crop science. July/Aug 1987. v. 27 (4). p. 699-702. Includes references. (NAL Call No.: DNAL 64.8 C883).

0154

A field technique for screening for genotypic differences in root growth.
CRPSAY. Robertson, B.M. Hall, A.E.; Foster, K.W. Madison, Wis. : Crop Science Society of America. Crop science. Nov/Dec 1985. v. 25 (6). p. 1084-1090. Includes references. (NAL Call No.: DNAL 64.8 C883).

0155

Gas exchange, carbon isotope discrimination, and chloroplast ultrastructure of a chlorophyll-deficient mutant of cowpea.
CRPSAY. Kirchhoff, W.R. Hall, A.E.; Thomson, W.W. Madison, Wis. : Crop Science Society of America. Chlorophyll-deficient mutants provide an opportunity for studying relationships among chlorophyll composition, chloroplast ultrastructure, and plant function. A chlorophyll-deficient mutant of cowpea Vigna unguiculata (L.) Walp. and its normally pigmented parent were grown in glasshouse and field conditions. The chlorophyll (a + b) content of the mutant was 35 to 48% less per unit leaf area and the chlorophyll a:b ratio was 62 to 74% greater than the parents. Chloroplasts of the mutant had distended thylakoids and substantially reduced granal stacking, supporting the hypothesis that chlorophyll content, chlorophyll a:b ratio, and

chloroplast lamellar organization are developmentally related. The mutant had significantly higher CO_2 assimilation rates per unit leaf area (+13%) at high photon flux densities and a quantum requirement that was not significantly different from the parent. Apparently, the mutant's ability to assimilate CO_2 was not adversely affected by the substantial changes in chlorophyll content and composition, and chloroplast ultrastructure, compared with the parent. Significant differences in 13C discrimination for leaves sampled from field-grown plants led to the prediction that plants in a drier treatment had higher intrinsic water-use efficiency than well-watered plants, which was consistent with significant differences observed in leaf gas exchange by the same plants. The mutant had significantly greater 13C discrimination than the parent; however, leaf gas exchange data indicated no significant differences in intrinsic water-use efficiency. Crop science. Jan/Feb 1989. v. 29 (1). p. 109-115. ill. Includes references. (NAL Call No.: DNAL 64.8 C883).

0156

A gene for resistance to common blight (Xanthomonas campestris pv. phaseoli).
Adams, M.W. Kelly, J.D.; Saettler, A.W. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1988. v. 31. p. 73-74. (NAL Call No.: DNAL SB327.A1B5).

0157

Generation mean analysis of beans Phaseolus vulgaris L. to O3 inheritance.
Mebrahtu, T. Rangappa, M.; Chappelka, A.H.; Robbins, E.; Benepal, P.S. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1988. v. 31. p. 110-111. Includes references. (NAL Call No.: DNAL SB327.A1B5).

0158

Genetic and cultural of Fusarium root rot in bush snap beans.
PLDIDE. Silbernagel, M.J. Mills, L.J. St. Paul, Minn. : American Phytopathological Society. Plant disease. Jan 1990. v. 74 (1). p. 61-66. Includes references. (NAL Call No.: DNAL 1.9 P69P).

0159

Genetic control over hybrid plant development in interspecific crosses between Phaseolus vulgaris L. and Phaseolus acutifolius A. Gray.
Parker, J.P. Michaels, T.E. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. Mar 1986. v. 29. p. 22-23. (NAL Call No.: DNAL SB327.A1B5).

0160

Genetic variation and genotype X environment interaction for leaf iron-deficiency chlorosis in dry beans (Phaseolus vulgaris L.).
Zaiter, H.Z. Coyne, D.P.; Clark, R.B. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1987. v. 30. p. 60-61. (NAL Call No.: DNAL SB327.A1B5).

0161

Genetic variation and inheritance of resistance of leaf iron deficiency chlorosis in dry bean (Phaseolus vulgaris L.).
Zaiter, H.Z. Coyne, D.P.; Clark, R.B. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1987. v. 30. p. 59. (NAL Call No.: DNAL SB327.A1B5).

0162

Genetic variation in field and nutrient solutions and the effect of temperature for leaf chlorosis in dry beans (Phaseolus vulgaris L.).
Zaiter, H.Z. Coyne, D.P.; Clark, R.B.; Nuland, D.S. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. Mar 1986. v. 29. p. 34. (NAL Call No.: DNAL SB327.A1B5).

0163

Genotypic diversity in the suitability of cowpea (Rosales: Leguminosae) pods and seeds for cowpea weevil (Coleoptera: Bruchidae) oviposition and development.
JEENAI. Fitzner, M.S. Hagstrum, D.W.; Knauft, D.A.; Buhr, K.L.; McLaughlin, J.R. College Park, Md. : Entomological Society of America. Journal of economic entomology. Aug 1985. v. 78 (4). p. 806-810. Includes references. (NAL Call No.: DNAL 421 J822).

0164

Geometric mean of stress and control yield as a selection criterion for drought tolerance.
Samper, C. Adams, M.W. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. Mar 1985. v. 28. p. 53-54. (NAL Call No.: DNAL SB327.A1B5).

0165

Germination and emergence response of common and tepary beans to controlled temperature.
AGJOAT. Scully, B. Waines, J.G. Madison, Wis. : American Society of Agronomy. Agronomy journal. Mar/Apr 1987. v. 79 (2). p. 287-291. Includes references. (NAL Call No.: DNAL 4 AM34P).

0166

Growing lima beans.
Turner, J. Strother, G.; Gazaway, W.S.; Patterson, M. Auburn, Ala. : The Service. Circular ANR - Cooperative Extension Service, Auburn University. In subseries: Horticulture. Mar 1988. (215). 4 p. (NAL Call No.: DNAL S544.3.A2C47).

0167

Growing lima beans.
Williams, J.L. Strother, G.; Gazaway, W.S.; Patterson, M. Auburn, Ala. : The Service. Circular ANR - Cooperative Extension Service, Auburn University. Dec 1986. (215). 4 p. (NAL Call No.: DNAL S544.3.A2C47).

0168

Heat tolerance and pod set in green beans.
JOSHB. Dickson, M.H. Petzoldt, R. Alexandria, Va. : The Society. Heat at any growth stage can damage green beans (Phaseolus vulgaris L.), but plants are most susceptible at or near bloom. The effect of heat during the bloom period resulted in reduction of a yield in proportion to the duration of the heat period. The most critical growth stage was found to be 2 to 3 days before anthesis, rather than at anthesis itself. By subjecting F1 plants to heat during the bloom period, genetic selection for heat tolerance was moderately effective. The heritability for heat tolerance was quite low. Broad-sense heritability was 19% to 79% and narrow-sense heritability 0% to 14%. The values are probably conservative, since during the genetic study the heat period was initiated on the first day of bloom, which resulted in some escapes and excess variability. Journal of the American Society for Horticultural Science. Sept 1989. v. 114 (5). p. 833-836. Includes references. (NAL Call No.: DNAL 81 S012).

0169

Heritability of resistance in cowpea to the western plant bug.
CRPSAY. Bosque-Perez, N.A. Foster, K.W.; Leigh, T.F. Madison, Wis. : Crop Science Society of America. Crop science. Nov/Dec 1987. v. 27 (6). p. 1133-1136. Includes references. (NAL Call No.: DNAL 64.8 C883).

0170

Heritability, phenotypic correlations, and associations of the common blight disease reactions in beans.
JOSHB. Aggour, A.R. Coyne, D.P. Alexandria, Va. : The Society. Common blight in beans (Phaseolus vulgaris L.) incited by Xanthomonas campestris pv. phaseoli (Smith) Dye (X c p) reduces crop yield and seed quality. The objective of this experiment was to study heritability and phenotypic correlations of the disease reaction to various strains of X c p at several plant developmental stages in specific bean crosses using diverse methods of inoculation. Leaf and pod disease reactions to strains X c p were inherited quantitatively and narrow-sense heritability estimates were low in the following crosses between Phaseolus vulgaris cultivars/lines: Bac-6 (moderately resistant = MR) x NE-EP1 (MR); Bat-862 (MR) x Pompadour Checa' (susceptible = S); Pompadour Checa' (S) x Bac-6 (MR); Venezuela 44' (S) x Bat-862 (MR). Pod disease reaction was not correlated with leaf disease reaction at any growth stage. Low or nonsignificant phenotypic correlations were detected between disease reactions of leaves at the seedling and flowering stages with the several methods of inoculation. Intermediate phenotypic cprrelations were found for disease reactions with three methods of inoculation at the seedling stage, but only with two methods in the flowering stage. Negative or nonsignificant phenotypic correlations were observed between leaf disease reaction and number of days to first flower. Different duplicate recessive genes were found to control two foliar abnormality traits: crippled growth and variegated leaves . No plants with a combination of both traits were observed. An association was found between crippled growth and a high level of resistance to strain V3S8 of Xc p in the cross Bat-862 x Pompadour Checa'. Journal of the American Society for Horticultural Science. Sept 1989. v. 114 (5). p. 828-833. ill. Includes references. (NAL Call No.: DNAL 81 S012).

0171

Identification of in vitro resistance of pigeon peas Cajanus cajan (L.) Millsp. to Phytophthora stem canker.
JAUPA. Rodriguez, R. Melendez, P.L. Mayaguez : University of Puerto Rico, Agricultural Experiment Station. The Journal of agriculture of the University of Puerto Rico. Jan 1985. v. 69 (1). p. 11-17. ill. Includes references. (NAL Call No.: DNAL 8 P832J).

0172

Identification of new sources of resistance to root-knot nematodes in Phaseolus.
CRPSAY. Omwega, C.O. Thomason, I.J.; Roberts, P.A.; Waines, J.G. Madison, Wis. : Crop Science Society of America. Resistance to root-knot nematode, Meloidogyne incognita (Kofoid and white) Chitwood, has been identified and incorporated into commercial cultivars of common bean, Phaseolus vulgaris L. However, the effective use of host resistance as a management tactic against root-knot nematodes attacking common bean requires identification and incorporation of resistance to other economically important rootknot nematodes, namely M. javanica (Treub) Chitwood, M. arenaria and M. hapla. Fifty-four common bean and 64 tepary bean, P. acutifolius A. Gray, lines were screened for resistance to root-knot

nematodes under greenhouse and growth chamber conditions. In the greenhouse, the plants were grown in pots filled with loamy sand and, in the growth chamber, the plants were grown in growth pouches. Bean plants in the greehouse were inoculated with 5000 nematode eggs and evaluated for nematode reproduction (eggs) 6 wk after inoculation. In the growth chamber, plants were inoculated with 1000 second-stage juveniles and evaluated for egg numbers 4 wk after inoculation. Common bean lines PI 165426 and Alabama no. 1 were found to be resistant to M. incognita Race 2, 3 and 4 but were susceptible to M. incognita Race 1 and to M. arenaria. Breeding lines A252, A315, A328, A443 and A445 were resistant to M. javanica and M. incognita Race 1. Resistance in the A lines was found to be derived from two common bean landraces, G1805 and G2618. The resistance was also effective against M. arenaria. The tepary bean accession PI 310606 was found to have good resistance to all nematode isolates tested. We postulate that resistance derived from G1805 and G2618 may be under different genetic control than that PI 165426 and Alabama no. 1. Crop science. Nov/Dec 1989. v. 29 (6). p. 1463-1468. Includes references. (NAL Call No.: DNAL 64.8 C883).

0173

Identification of Pseudomonas syringae pv. phaseolicola by a DNA hybridization probe.
PHYTA. Schaad, N.W. Azad, H.; Peet, R.C.; Panopoulos, N.J. St. Paul, Minn. : American Phytopathological Society. A 32P-labeled DNA probe carrying a gene(s) involved in phaseolotoxin production by Pseudomonas syringae pv. phaseolicola was used to detect and identify P. s. phaseolicola in pure or mixed cultures, seed-soak liquids, and diseased specimens collected in the field. The probe hybridized with all 34 strains of P. s. phaseolicola tested. All interspecific (pathovar) or intergeneric hybridizations were negative. Hybridization tests were highly reliable for pathogen detection and identification when individual colonies of P. s. phaseolicola could be picked individually from seed-soak liquid assay plates or when maceration fluids from disease lesions were assayed. Probings of maceration fluids from disease lesions also were highly reliable. In contrast, soak liquids from seeds contaminated with P. s. phaseolicola or washings of colonies from agar plates of such liquids gave variable results. Phytopathology. Aug 1989. v. 79 (8). p. 903-907. ill. Includes references. (NAL Call No.: DNAL 464.8 P56).

0174

Impact testing of Navy bean pods.
Adam, N.M. Burkhardt, T.H. St. Joseph, Mich. The Society. American Society of Agricultural Engineers (Microfiche collection). Paper presented at the 1986 Summer Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St. Joseph, Michigan 49085. Telephone the Order Dept. at (616) 429-0300 for information and prices. 1986. (fiche no. 86-3026). 19 p. ill. Includes references. (NAL Call No.: DNAL FICHE S-72).

0175

Implications of year X season X genotype interactions in mungbean yield trials.
JOSHB. Fernandez, G.C.J. Chen, H.K. Alexandria, Va. : The Society. Knowledge of the type and extent of the genotype x environment (G x E) interaction on a particular crop can be applied to improve the efficiency of resource allocation in long-term yield trials. Estimates of the relative magnitude of G x E, for seed yield and related traits, were obtained from mungbean Vigna radiata (L.) Wilezek field trials conducted at the Asian Vegetable Research and Development Center (AVRDC) in Taiwan. Ten diverse genotypes were evaluated in spring, summer, and fall during 2 years. Photoperiod, temperature, and distribution of pest and diseases vary distinctly during these seasons. The sigma (2)G was greater than the sigma (2)GE for plant height, seeds per pod, 100-seed weight, and days to flowering; however, seed yield, first harvest percentage, pods per plant, and mean maturity were greatly influenced by sigma (2)GE.sigma (2)GY was significant for all variables, except seed weight, while sigma (2)GS was significant for plant height, pods per plant, seeds per pod, and days to flowering. The second-order interactions, G x Y x S, were large and greater than the first-order interactions (G x Y, G x S) for seed yield, pods per plant, and seeds per pod. Estimates of expected error variance for genotypic mean from varying years, replications, and three seasons suggest that 3 years and three replications would be effective in selecting promising lines from three-season yield trials conducted at AVRDC. Journal of the American Society for Horticultural Science. Nov 1989. v. 114 (6). p. 999-1002. Includes references. (NAL Call No.: DNAL 81 S012).

0176

Influence of cultivar, nitrogen, and frequency of insecticide application on vegetable leafminer (Diptera: Agromyzidae) population density and dispersion on snap beans.
JEENAI. Hanna, H.Y. Story, R.N.; Adams, A.J. College Park, Md. : Entomological Society of America. Journal of economic entomology. Feb 1987. v. 80 (1). p. 107-110. Includes references. (NAL Call No.: DNAL 421 J822).

0177

Influence of water stress on nitrogen fixation in cowpea.
JOSHB. Walker, D.W. Miller, J.C. Jr. Alexandria, Va. : The Society. Journal of the American Society for Horticultural Science. May 1986. v. 111 (3). p. 451-458. Includes

references. (NAL Call No.: DNAL 81 S012).

0178

Inheritance and combining ability of leafhopper defense mechanisms in common bean.
CRPSAY. Kornegay, J.L. Temple, S.R. Madison, Wis. : Crop Science Society of America. Crop science. Nov/Dec 1986. v. 26 (6). p. 1153-1158. Includes references. (NAL Call No.: DNAL 64.8 C883).

0179

Inheritance of bruchid resistance in cowpea.
CRPSAY. Adjadi, O. Singh, B.B.; Singh, S.R. Madison, Wis. : Crop Science Society of America. Crop science. Sept/Oct 1985. v. 25 (5). p. 740-742. Includes references. (NAL Call No.: DNAL 64.8 C883).

0180

Inheritance of heat-induced brown discoloration in seed coats of cowpea.
CRPSAY. Patel, P.N. Hall, A.E. Madison, Wis. : Crop Science Society of America. Cowpea Vigna unguiculata (L.) Walp. accession TVu 4552 is useful in breeding programs as a donor of heat tolerance during flowering. Unfortunately, seed coats of TVu 4552 and some other cowpea strains (e.g. 'TV X 3236') develop a pronounced brown discoloration when the plants are grown under hot air temperatures. The browning is intracellular and confined to the seed coat. It does not influence germination, but it makes the grain less desirable to consumers. Inheritance of browning was studied in crosses of TVu 4552 with 'California Blackeye ~ ' (white seed coat, blackeye), 'Bambey 21' (white seed coat, no eye), and PI 204647 (kaiser brown seed coat, no eye) whose seed coat colors were not affected by high air temperatures. Segregation for seed coat browning was determined by observing the frequency of plants that produced at least some seeds with some brown discoloration, and plants for which all seeds had normal seed coat color. Analysis of F1, F2, F3 and backcross progenies showed that the seed coat browning reaction is dominant to normal seed coat color and governed by a single nuclear gene. It is suggested that this gene be designated as Hbs. No linkage was observed between Hbs-controlled seed coat browning and the gene governing heat tolerance during floral bud development in TVu 4552. Similarly, no apparent association was observed between the development of normal brown seed coat pigmentation in PI 204647 and heat-induced brown seed coat discoloration controlled by Hbs. Crop science. Nov/Dec 1988. v. 28 (6). p. 929-932. Includes references. (NAL Call No.: DNAL 64.8 C883).

0181

Inheritance of low temperature tolerance in beans at several growth stages.
Dickson, M.H. Petzoldt, R. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. Mar 1986. v. 29. p. 7-8. (NAL Call No.: DNAL SB327.A1B5).

0182

Inheritance of resistance to broad bean wilt virus in bean.
HJHSA. Provvidenti, R. Alexandria, Va. : American Society for Horticultural Science. HortScience. Oct 1988. v. 23 (5). p. 895-896. Includes references. (NAL Call No.: DNAL SB1.H6).

0183

Inheritance of resistance to common bacterial blight in common bean.
Scott, M.E. Michaels, T.E. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1988. v. 31. p. 72. (NAL Call No.: DNAL SB327.A1B5).

0184

Inheritance of resistance to peanut mottle virus in Phaseolus vulgaris.
JOHEA. Provvidentl, R. Chirco, E.M. Washington, D.C. : American Genetic Association. The Journal of heredity. Nov/Dec 1987. v. 78 (6). p. 402-403. Includes references. (NAL Call No.: DNAL 442.8 AM3).

0185

Inheritance of resistance to two races of fusarium wilt in three cowpea cultivars.
CRPSAY. Rigert, K.S. Foster, K.W. Madison, Wis. : Crop Science Society of America. Fusarium wilt caused by Fusarium oxysporum f. sp. tracheiphilum (E.F.Sm.) Snyder and Hansen is a serious disease of cowpea Vigna unguiculata (L.) Walp. in California. The objectives of this study were to determine the inheritance of resistance to F. oxysporum f. sp. tracheiphilum races 2 and 3 in 'California Blackeye Number Five' (CB5), 'California Blackeye Number Three' (CB3), and line 7964, and to determine if the genes for resistance to each race were independent of each other. Cultivar CB5 is susceptible and CB3 and 7964 are resistant to races 2 and 3. The F1, BC1, F2, and F5, progenies were evaluated for resistance to each race using a seedling root dip inoculation procedure. Some F1 and F2 progenies were also evaluated for resistance using a tray inoculation procedure. A single dominant race 3 resistance gene was identified in CB3 and a single dominant race 2 resistance gene was identified in 7964. The F3 family reaction to both races suggested that the race 3 gene in

CB3 also conferred incompletely dominant resistance to race 2, and the race 2 gene in 7964 also conferred incompletely dominant resistance to race 3. The reaction of F5 lines to both races did not support this hypothesis. It was concluded that CB3 also possessed a single incompletely dominant gene for race 2 resistance and that 7964 also possessed a single incompletely dominant gene for race 3 resistance. Crop science. Mar/Apr 1987. v. 27 (2). p. 220-224. Includes references. (NAL Call No.: DNAL 64.8 C883).

0186

Inheritance of two somaclonal variants in mung bean (Vigna radiata (L.) Wilczek).
JOHEA. Bhatia, C.R. Mathews, H. Washington, D.C. : American Genetic Association. The Journal of heredity. Mar/Apr 1988. v. 79 (2). p. 122-124. Includes references. (NAL Call No.: DNAL 442.8 AM3).

0187

Inheritance study for heat tolerance in common bean (Phaseolus vulgaris).
Arndt, G.C. Gepts, P. Fort Collins, Colo : Howard F. Schwartz, Colorado State University. Annual report of the Bean Improvement Cooperative. 1989. v. 32. p. 41-43. Includes references. (NAL Call No.: DNAL SB327.A1B5).

0188

Inheritance study of common bean, Phaseolus vulgaris L. to ambient O3 injury.
Mebrahtu, T. Rangappa, M.; Benepal, P.S. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1988. v. 31. p. 108-109. Includes references. (NAL Call No.: DNAL SB327.A1B5).

0189

Inter-varietal competition; the effect of different neighbors on relative yields of Phaseolus vulgaris varieties.
Isom, W.H. Vilchez, M. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. Mar 1986. v. 29. p. 13-14. (NAL Call No.: DNAL SB327.A1B5).

0190

Interaction of genetic resistance to fusarium root rot with cultural practices in a white-seeded bush snap bean.
Silbernagel, M.J. Doyle, T.J. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. Mar 1985. v. 28. p. 1-2. (NAL Call No.: DNAL SB327.A1B5).

0191

Internode length in Pisum. Gene na may block gibberellin synthesis between ent-7 alpha-hydroxykaurenoic acid and gibberellin A12-aldehyde.
PLPHA. Ingram, T.J. Reid, J.B. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Apr 1987. v. 83 (4). p. 1048-1053. Includes references. (NAL Call No.: DNAL 450 P692).

0192

Interspecific hybridization in Phaseolus: embryo culture.
Crocomo, O.J. Cabral, J.B. Columbus : Ohio State University Press, 1986. Biotechnology of plants and microorganisms / edited by O.J. Crocomo ... et al. . p. 85-96. Includes references. (NAL Call No.: DNAL TP248.6.B557).

0193

Intracellular localization of calmodulin on embryonic axes of Cicer arietinum L.
NASSD. Hernandez-Nistal, J. Aldasaro, J.J.: Rodriguez, D.; Babiano, J.: Nicolas, G. New York, N.Y. : Plenum Press. NATO advanced science institutes series : Series A : Life sciences. Paper presented at the workshop on "Molecular and Cellular Aspects of Calcium in Plant Development," July 15-19, 1985, Edinburgh, Scotland. 1985. v. 104. p. 313-315. Includes references. (NAL Call No.: DNAL QH301.N32).

0194

Is there more than one source of the 'I' gene?.
Kelly, J.D. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1988. v. 31. p. 148-149. Includes references. (NAL Call No.: DNAL SB327.A1B5).

0195

K+ regulates bacteroid-associated functions of Bradyrhizobium.
PNASA. Gober, J.W. Kashket, E.R. Washington, D.C. : The Academy. Proceedings of the National Academy of Sciences of the United States of America. July 1987. v. 84 (13). p. 4650-4654. Includes references. (NAL Call No.: DNAL 500 N21P).

0196

Light effects on several chloroplast components in norflurazon-treated pea seedlings.
PLPHA. Sagar, A.D. Horwitz, B.A.; Elliott, R.C.; Thompson, W.F.; Briggs, W.R. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Oct 1988. v. 88 (2). p. 340-347. ill. Includes references. (NAL Call No.: DNAL 450 P692).

0197

Light quality regulates expression of chloroplast genes and assembly of photosynthetic membrane complexes.
PNASA. Glick, R.E. McCauley, S.W.; Gruissem, W.; Melis, A. Washington, D.C. : The Academy. Proceedings of the National Academy of Sciences of the United States of America. June 1986. v. 83 (12). p. 4287-4291. Includes 34 references. (NAL Call No.: DNAL 500 N21P).

0198

Linkage analysis of hypersensitive resistance to four viruses in Phaseolus vulgaris L.
Kyle, M.M. Dickson, M.H.; Provvidenti, R. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. Mar 1986. v. 29. p. 80-81. Includes references. (NAL Call No.: DNAL SB327.A1B5).

0199

List of genes in Phaseolus vulgaris for resistance to viruses.
Provvidenti, R. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1987. v. 30. p. 1-4. Includes references. (NAL Call No.: DNAL SB327.A1B5).

0200

Localization and conditional redundancy of regulatory elements in rbcS-3A, a pea gene encoding the small subunit of ribulose-bisphosphate carboxylase.
PNASA. Kuhlemeier, C. Cuozzo, M.; Green, P.J.; Goyvaerts, E.; Ward, K.; Chua, N.H. Washington, D.C. : The Academy. Proceedings of the National Academy of Sciences of the United States of America. July 1988. v. 85 (13). p. 4662-4666. ill. Includes references. (NAL Call No.: DNAL 500 N21P).

0201

Low temperature induces galactinol synthase in leaves and seeds kidney bean and soybean.
Castillo, E.M. Lumen, B.O. de; Reyes, P.S. Fort Collins, Colo : Howard F. Schwartz, Colorado State University. Annual report of the Bean Improvement Cooperative. 1989. v. 32. p. 39. Includes references. (NAL Call No.: DNAL SB327.A1B5).

0202

A marker locus, Adh-1, for resistance to pea enation mosaic virus in Pisum sativum.
JOHEA. Weeden, N.F. Provvidenti, R. Washington, D.C. : American Genetic Association. The Journal of heredity. Mar/Apr 1988. v. 79 (2). p. 128-131. Includes references. (NAL Call No.: DNAL 442.8 AM3).

0203

Maternal investment and fruit abortion in Phaseolus vulgaris.
AJBOA. Nakamura, Robert R. Baltimore, Md. : Botanical Society of America. American journal of botany. July 1986. v. 73 (7). p. 1049-1057. Includes references. (NAL Call No.: DNAL 450 AM36).

0204

Measuring ozone sensitivity of white bean using digitized video image analysis.
Michaels, T.E. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. Mar 1986. v. 29. p. 20-21. (NAL Call No.: DNAL SB327.A1B5).

0205

Metribuzin tolerance within the genus Vigna.
WETEE9. Harrison, H.F. Jr. Champaign, Ill. : The Society. Weed technology : a journal of the Weed Science Society of America. Jan 1988. v. 2 (1). p. 59-63. Includes references. (NAL Call No.: DNAL SB610.W39).

0206

Mississippi Pinkeye--a new protepea.
RRMSD. Hare, W.W. Thompson, P.G. Mississippi State, Miss. : The Station. Research report - Mississippi Agricultural and Forestry Experiment Station. Nov 1988. v. 13 (11). 4 p. ill. (NAL Call No.: DNAL S79.E37).

0207

Morphological and physiological traits associated with agromyzid (Diptera: Agromyzidae) resistance in mungbean.
JEENAI. Talekar, N.S. Yang, H.C.; Lee, Y.H. College Park, Md. : Entomological Society of America. Morphological and physiological characters of three resistant and two susceptible mungbean accessions were studied to understand the nature of their resistance to agromyzid flies. The highly resistant accession had high trichome density on leaves and stems, purplish and smaller diameter stems, and smaller unifoliate leaves. Agromyzid adults showed lower preference for visiting seedlings of resistant compared with susceptible accessions for feeding and oviposition, which were significantly positively correlated with insect infestation. Pupation of the agromyzid was delayed when larvae were feeding inside stems of resistant compared with susceptible accessions. Plant tissues of resistant accessions damaged by agromyzid feeding had significantly fewer larvae and pupae compared with similar tissues of the susceptible accessions. Larvae of Porthesia taiwana Shiraki and Heliothis armigera Hubner had greater mortality and reduced pupation when fed unifoliate leaves of resistant compared with susceptible mungbean accessions. A combination of several characters appears to be responsible for resistance. Journal of economic entomology. Oct 1988. v. 81 (5). p. 1352-1358. Includes references. (NAL Call No.: DNAL 421 J822).

0208

Mutant alleles affecting bean seed protein expression.
Bliss, F.A. Osborn, T.C.; Romero-Andreas, J.; Gepts, P.L. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. Mar 1986. v. 29. p. 18-19. Includes references. (NAL Call No.: DNAL SB327.A1B5).

0209

New lima bean tolerates drought like a camel.
AGREA. Kaplan, K. Washington, D.C. : The Administration. Agricultural research - U.S. Department of Agriculture, Agricultural Research Service. May 1988. v. 36 (5). p. 9. ill. (NAL Call No.: DNAL 1.98 AG84).

0210

A new technique for crossing mungbeans.
CRPSAY. Cupka, T.B. Edwards, L.H. Madison, Wis. : Crop Science Society of America. Crop science. July/Aug 1986. v. 26 (4). p. 830-831. Includes 3 references. (NAL Call No.: DNAL 64.8 C883).

0211

Nitrate utilization and dinitrogen fixation (acetylene reduction) by nitrate reductase-deficient mutants of pea.
CRPSAY. Vigue, G.T. Warner, R.L. Madison, Wis. : Crop Science Society of America. Crop science. May/June 1987. v. 27 (3). p. 548-522. Includes references. (NAL Call No.: DNAL 64.8 C883).

0212

Nitrogen nutrition of nodules in relation to 'N-hunger' in cowpea (Vigna unguiculata L. Walp).
PLPHA. Atkins, C.A. Pate, J.S.; Sanford, P.J.; Dakora, F.D.; Matthews, I. Rockville, Md. : American Society of Plant Physiologists. Early growth, nodule development, and nitrogen fixation by two cultivars of cowpea (Vigna unguiculate L. Walp), one large-seeded (Vita 3; 146.0 +/- 0.9 milligrams seed dry weight, 4.1 +/- 0.2 milligrams seed N), the other small-seeded (Caloona; 57.5 +/- 2.5 milligrams seed dry weight, 1.8 +/- 0.1 milligrams seed N), were compared under conditions of sand culture with nutrient solution free of combined N. The seed stocks used had been obtained from plants uniformly labeled with 15N, thus enabling changes with time in distribution of cotyledon and fixed N among plant parts to be measured by isotope dilution. Caloona, but not Vita 3, showed physiological symptoms of 'N hunger,' i.e. transient loss of chlorophyll (visible yellowing) and from the first-formed unifoliolate leaves at or around the onset of symbiotic functioning and N2 fixation. The smaller-seeded Caloona showed higher early nitrogenase activity than the larger-seeded Vita 3 and by 28 days had fixed 6.6 milligrams of N per milligram of seed N mg N . (mg seed N)-1 versus only 3.5 mg N . (mg seed N)-1 in Vita 3. Both cultivars lost around 30% of their initial seed at germination, mostly as fallen cotyledons. Abscised cotyledons of Caloona contained 1.21 +/- 0.17% N; those of Vita 3 contained 2.61 +/- 0.37% N. When compared on the basis of cotyledon N available for seedling growth, Caloona was shown to have fixed 10.6 mg N . (mg seed N)-1 and Vita 3 only 5.3 mg N . (mg seed N)-1. Most of the cotyledon N withdrawn from the unifoliolate leaf pair of Caloona during 'N-hunger' was committed to early nodule growth and, in total, 20 to 25% of the cotyledon N resource of this cultivar was ultimately invested in establishment of symbiosis compared with only 7% in Vita 3. Plant physiology. Aug 1989. v. 90 (4). p. 1644-1649. Includes references. (NAL Call No.: DNAL 450 P692).

0213

Nymph growth and development, oviposition, and seed damage on cowpea by Lybus hesperus (Heteroptera: Miridae).
JEENAI. Bosque-Perez, N.A. Leigh, T.F.; Foster, K.W.; Duffey, S.S. College Park, Md. : Entomological Society of America. Journal of

economic entomology. Dec 1985. v. 78 (6). p. 1254-1258. Includes references. (NAL Call No.: DNAL 421 J822).

0214

Oviposition site preference of Lygus hesperus (Hemiptera: Miridae) on common bean in relation to bean age and genotype.
JEENAI. Alvarado-Rodriquez, B. Leigh, T.F.; Foster, K.W. College Park, Md. : Entomological Society of America. Journal of economic entomology. Aug 1986. v. 79 (4). p. 1069-1072. Includes references. (NAL Call No.: DNAL 421 J822).

0215

Pathogenic variability, resistance sources, and progress towards developing stable resistance to bean rust.
Stavely, J.R. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. Mar 1986. v. 29. p. 24-25. Includes references. (NAL Call No.: DNAL SB327.A1B5).

0216

Pea enation mosaic virus resistance in lentil (Lens culinaris).
PLDRA. Aydin, H. Muehlbauer, F.J.; Kaiser, W.J. St. Paul, Minn. : American Phytopathological Society. Plant disease. July 1987. v. 71 (7). p. 635-638. ill. Includes references. (NAL Call No.: DNAL 1.9 P69P).

0217

Performance of dry beans grown on the coastal plains of Puerto Rico.
JAUPA. Beaver, J.S. Badillo-Feliciano, J.; Reyes-Soto, I. Mayaguez : University of Puerto Rico, Agricultural Experiment Station. The Journal of agriculture of the University of Puerto Rico. Apr 1985. v. 69 (2). p. 125-133. Includes references. (NAL Call No.: DNAL 8 P832J).

0218

Photoperiod and light quality effects on cowpea floral development at high temperatures.
CRPSAY. Mutters, R.G. Hall, A.E.; Patel, P.N. Madison, Wis. : Crop Science Society of America. High temperatures in tropical and subtropical zones often have detrimental effects on plants. Plants in these zones experience differences in daylength that could influence sensitivity to heat. Contrasting genotypes of cowpea. Vigna unguiculata (L.) Walp., were grown under fluorescent plus incandescent (F) or metal halide plus incandescent (MH) lamps at different daylengths (11, 12, 13, 14, or 16 h) to determine whether the sensitivity of floral development to high night temperatures is influenced by light quality and photoperiod. Floral bud development was suppressed in heat-sensitive genotype (CB5) at a 14-h photoperiod under MH, while a 16-h photoperiod was required to elicit a similar response under F. Spectral analysis showed five times more ultraviolet-A light (UV-A) (315-400 nm) in MH than in F, but F supplemented with UV-A light did not elicit the same suppression of floral bud development as MH. The reproductive response to long days with hot nights (30 degrees C) was closer to that of field-grown plants under MH than under F. Percent pod set of two sensitive genotypes (CB5 and 7964) subjected to high temperatures (33/30 degrees C day/night) was higher (23 and 19%) at an 11-h photoperiod than at a 14-h photoperiod (5%) under F. No pod set occurred in an 11-h photoperiod with red light (R) during the night. Substantial pod set (41%) was observed when a 14-h photoperiod was followed by far-red light (FR). The effect was reversed when FR was immediately followed by R. Apparently, pod set at high night temperatures in heat-sensitive, day-neutral cowpea is dependent on photoperiod through a mechanism involving phytochrome. Crop science. Nov/Dec 1989. v. 29 (6). p. 1501-1505. Includes references. (NAL Call No.: DNAL 64.8 C883).

0219

Photosynthesis-associated gene families: differences in response to tissue-specific and environmental factors.
SCIEA. Simpson, J. Van Montagu, M.; Herrera-Estrella, L. Washington, D.C. : American Association for the Advancement of Science. Science. July 4, 1986. v. 233 (4759). p. 34-38. ill. Includes 31 references. (NAL Call No.: DNAL 470 SCI2).

0220

Photosynthetic responses to heat stress in common bean genotypes differing in heat acclimation potential.
CRPSAY. Chaisompongpan, N. Li, P.H.; Davis, D.W.; Markhart, A.H. III. Madison, Wis. : Crop Science Society of America. Photosynthesis is one of the most heat-sensitive processes in plants. The common bean (Phaseolus vulgaris L.) is notoriously sensitive to heat. The objectives of this study were to determine the photosynthetic activities of six common bean genotypes under heat stress and whether these activities correspond with the genotypes' ranking in purported heat acclimation potential (HAP). The HAP is defined as the change in leaf heat tolerance, based on plasmalemma thermostability measured by electrolyte leakage, at the prefloral growth stage of plants after acclimation at 37 degrees C day/night for 24 h. Photosynthetic response to short-term heat stress (5 min at 42 or 45 degrees C) was expressed by O2 evolution and chlorophyll fluorescence. Without heat acclimation, heat stress at 42 degrees C

decreased O2 evolution in the six genotypes from 50 to more than 95%, compared with the controls, and heat stress at 45 degrees C almost totally inhibited O2 evolution in all genotypes. Heat stress had less effect on peak fluorescence level than on O2 evolution. Heat acclimation slightly reduced O2 evolution, compared with nonacclimated controls. In heat-acclimated plants, heat stress at 42 degrees C had no effect on O2 evolution, whereas stress at 45 degrees C significantly reduced O2 evolution. Changes in levels of peak fluorescence under heat stress in heat-acclimated plants showed patterns similar to changes in O2 evolution. Photosynthetic responses to heat stress did not total ly correspond with the ranking of HAPs of the six genotypes obtained by conductivity test. Full recovery of O2 evolution from heat injury at 42 degrees C for 5 min occurred within 4 h in GNUI 59, whereas O2 evolution rates were still lower than the controls after 6 h in the other genotypes. The recovery of chlorophyll fluorescene was slower than that of O2 evolution. Crop science. Jan/Feb 1990. v. 30 (1). p. 100-104. Includes references. (NAL Call No.: DNAL 64.8 C883).

0221

Plant defense gene regulation.
Lamb, C.J. Dron, M.; Clouse, S.D.; Dixon, R.A.; Lawton, M.A. Cold Spring Harbor, N.Y. : Cold Spring Harbor Laboratory, 1988. Genetic improvements of agriculturally important crops : progress and issues / edited by Robert T. Fraley, Nicholas M. Frey, Jeff Schell. p. 31-35. ill. Includes references. (NAL Call No.: DNAL QK981.5.G464).

0222

Production, insect and weed considerations with dry peas, lentils, chickpeas and faba beans.
Muehlbauer, F.J. St. Paul, Minn. : Center for Alternative Crops and Products, University of Minnesota, 1987? . Grain legumes as alternative crops : a symposium / sponsored by the Center for Alternative Crops and Products, University of Minnesota, July 23-24, 1987. p. 133-150. ill. Includes references. (NAL Call No.: DNAL SB317.L43G73).

0223

Proline content of the anthers and pollen of heat-tolerant and heat-sensitive cowpea subjected to different temperatures.
CRPSAY. Mutters, R.G. Ferreira, L.G.R.; Hall, A.E. Madison, Wis. : Crop Science Society of America. High temperatures cause reductions in grain yield of cowpea (Vigna unguiculata (L.) Walp. that are associated with low pollen viability and pod set. Preliminary controlled environment studies showed differences in proline accumulation in anthers and pollen of heat-tolerant and heat-sensitive genotypes under hot and optimal temperatures, but insufficient tissue was available to establish if the differences were significant. The objective was to determine whether heat injury under field conditions is associated with specific patterns of proline accumulation in leaves and reproductive tissue using heat-sensitive an heat-tolerant cowpea genotypes. Under moderate and hot temperatures, proline was the most abundant free amino acid in the anthers of both heat-sensitive and heat-tolerant cowpea genotypes. No differences in leaf proline concentrations were observed. Under hot conditions, proline levels in anthers decreased faster as pollen matured in heat-tolerant genotypes as compared with heat-sensitive genotypes. At pollen maturity, heat-sensitive genotypes contained more proline in anthers and had lower levels in pollen than the heat-tolerant genotypes under hot conditions but similar levels under more optimal temperatures. The results suggest that heat injury during floral development of sensitive cowpea genotypes may be due to inhibition of proline translocation from anther walls to pollen. Crop science. Nov/Dec 1989. v. 29 (6). p. 1497-1500. Includes references. (NAL Call No.: DNAL 64.8 C883).

0224

Rapid transient induction of phenylalanine ammonia-lyase mRNA in elicitor-treated bean cells.
PNASA. Edwards, K. Cramer, C.L.; Bolwell, G.P.; Dixon, R.A.; Schuch, W.; Lamb, C.J. Washington, D.C. : The Academy. Proceedings of the National Academy of Sciences of the United States of America. Oct 1985. v. 82 (20). p. 6731-6735. ill. Includes 44 references. (NAL Call No.: DNAL 500 N21P).

0225

Rate of water loss from detached leaves of drought resistant and susceptible genotypes of cowpea.
HJHSA. Walker, D.W. Miller, J.C. Jr. Alexandria, Va. : American Society for Horticultural Science. HortScience. Feb 1986. v. 21 (1,section 1). p. 131-132. Includes references. (NAL Call No.: DNAL SB1.H6).

0226

Reduction of fusarium root rot and sclerotinia wilt in beans with irrigation, tillage, and bean genotype.
PLDRA. Miller, D.E. Burke, D.W. St. Paul, Minn. : American Phytopathological Society. Plant disease. Feb 1986. v. 70 (2). p. 163-166. Includes 6 references. (NAL Call No.: DNAL 1.9 P69P).

0227

Registration of F-1072 lima bean germplasm. CRPSAY. Thomas, C.A. Madison, Wis. : Crop Science Society of America. Crop science. Mar/Apr 1985. v. 25 (2). p. 369. Includes 3 references. (NAL Call No.: DNAL 64.8 C883).

0228

Relative effect of root and shoot genotypes on yield of common bean under drought stress. CRPSAY. White, J.W. Castillo, J.A. Madison, Wis. : Crop Science Society of America. The inherent interactions of roots and shoots make it difficult to determine whether a characteristic such as response to drought is under control of genes expressed in roots, shoots, or throughout the plant. One approach for obtaining such information is to interchange root and shoot genotypes through grafting. In this study, plants of common bean (Phaseolus vulgaris L.) were cleft grafted and then transplanted to the field to evaluate their yield response under drought. Anticipating that the importance of root or shoot genotype would vary with genotypes evaluated, variation in rainfall patterns, and soil conditions, four yield trials with varying sets of genotypes were conducted at two sites with highly contrasting soils. At Palmira, Colombia, the soil was a fertile Mollisol (Aquic Hapludoll, pH = 7.7), and at Quilichao, Colombia, an Oxisol (Plinthic Kandiudox, pH = 5.0), where problem of low pH and high Al saturation were expected to adversely affect root growth. In all trials, root genotype had a significant and usually large effect on seed yield, while shoot genotype had no effect. No root and shoot genotype interaction occurred, and an effect of grafting was only detected in one trial. These results suggest that root characteristics are of primary importance in determining drought response of common bean and, conversely, that shoot characteristics are of much less importance. However, response of specific genotypes varies greatly with environment. Crop science. Mar/Apr 1989. v. 29 (2). p. 360-362. Includes references. (NAL Call No.: DNAL 64.8 C883).

0229

Row spacing, plant population, and genotype X row spacing interaction effects on yield and yield components of dry bean. AGJOAT. Grafton, K.F. Schneiter, A.A.; Nagle, B.J. Madison, Wis. : American Society of Agronomy. Agronomy journal. July/Aug 1988. v. 80 (4). p. 631-634. Includes references. (NAL Call No.: DNAL 4 AM34P).

0230

Seed abortion and seed size variation within fruits of Phaseolus vulgaris: pollen donor and resource limitation effects. AJBOAA. Nakamura, R.R. Columbus, Ohio : Botanical Society of America. American journal of botany. July 1988. v. 75 (7). p. 1003-1010. Includes references. (NAL Call No.: DNAL 450 AM36).

0231

Seed moisture and development of early planted cowpea. Marsh, L. Jones, R. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1987. v. 30. p. 76-77. Includes references. (NAL Call No.: DNAL SB327.A1B5).

0232

Selection and inheritance of heat tolerance in the common bean by use of conductivity. JOSHB. Marsh, L.E. Davis, D.W.; Li, P.H. Alexandria, Va. : The Society. Journal of the American Society for Horticultural Science. Sept 1985. v. 110 (5). p. 680-683. Includes references. (NAL Call No.: DNAL 81 S012).

0233

Selection for bean yield under low and high stress environments. Singh, S.P. Cajiao, C.; Gutierrez, J.A.; Garcia, J.; Pastor-Corrales, M.A.; Morales, F.J. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1988. v. 31. p. 87. (NAL Call No.: DNAL SB327.A1B5).

0234

Selection for seed yield in inter-gene pool crosses of common bean. CRPSAY. Singh, S.P. Cajiao, C.; Gutierrez, J.A.; Garcia, J.; Pastor-Corrales, M.A.; Morales, F.J. Madison, Wis. : Crop Science Society of America. The need to maximize yield of common bean (Phaseolus vulgaris L.) without increasing production costs is increasing in most countries. High-yielding cultivars tolerant to production constraints are needed. Our objectives, therefore, were to: (i) determine the effects of input levels on selection for seed yield, (ii) compare the relative yield gains in crosses among gene pools, and (iii) study yield stability of selected lines. Six inter-gene pool crosses of Middle and South American common bean were used. Visual mass selection for seed yield in individual plants was practiced in the F2 and F3 generations. In the F4, single plants were harvested. From F5 to F8, selection was based on plot yields. The six highest-yielding lines

from each cross and each environment were compared with five high yielding parents and four checks at high- and low-input levels over 3 yr (1984-1986). Differences among years, crosses, and lines within crosses were observed for all traits. Under low input, there was a 31% reduction in yield and 7% reduction in seed weight, but maturity was accelerated. Differential anthracnose (Colletotrichum lindemuthianum) pressures did not affect the levels of resistance of selected lines. Selection was effective in both environments, but the two groups of selected lines did not differ in mean yield. Crosses within small-seeded Middle American (SSMA) and between SSMA and large-seeded Andean American gene pools did not produce lines yielding more than the highest yielding parent or check. Only lines selected from two higher yielding crosses between small- and medium-seeded gene pools of Middle America outyielded the best parent and check cultivar. Crop science. Sept/Oct 1989. v. 29 (5). p. 1126-1131. Includes references. (NAL Call No.: DNAL 64.8 C883).

0235

Stress tolerance improvement of Phaseolus vulgaris L. by gene introgression from Phaseolus acutifolius A. Gray.
Pratt, R.C. Marcarian, V.; Bressan, R.A. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. Mar 1986. v. 29. p. 47-48. Includes references. (NAL Call No.: DNAL SB327.A1B5).

0236

Synthesis of mitogenic phytohemagglutinin-L in Escherichia coli.
Hoffman, L.M. Donaldson, D.D. New York, N.Y. : Nature Pub. Co. Bio/technology. Feb 1987. v. 5 (2). p. 157-160. ill. Includes references. (NAL Call No.: DNAL QH442.B5).

0237

Temperature and photoperiod influence reproductive development of reduced-photoperiod-sensitive mungbean genotypes.
JOSHB. Fernandez, G.C.J. Chen, H.K. Alexandria, Va. : The Society. Using the 9th and 10th International Mungbean Nursery (IMN) data, quadratic response surface models were developed to predict days to flowering (DF) of mungbean Vigna radiata (L.) Wilczek genotypes grown at 11-hr and 30 min and 13-hr and 30-min preflowering mean photoperiod and 22 to 30C mean diurnal temperature regimes. Both linear and quadratic effects were significant on DF and onthe rate of progress towards flowering (1/DF); however, only the linear effect was significant in days to maturity (DM). The effect of mean diurnal temperature was more pronounced than that of mean photoperiod on DF of reduced-photoperiod-sensitive (RPS) genotypes. The earliest DF (flowering tendency) was estimated at 34 days after planting at the optimum mean diurnal temperature of 28C and the optimum mean photoperiod of 12 hr. At the suboptimal temperature (mean diurnal temperature less than optimum mean diurnal temperature), the estimates of the base temperature Tb and the thermal time theta(r) were 10C and 555 degree-days, respectively. Thus, flowering dates of these RPS mungbean lines can be predicted, which in turn will assist in the selection of proper planting dates. Journal of the American Society for Horticultural Science. Mar 1989. v. 114 (2). p. 204-209. Includes references. (NAL Call No.: DNAL 81 S012).

0238

Transcriptional and posttranscriptional control of phaseolin and phytohemagglutinin gene expression in developing cotyledons of Phaseolus vulgaris.
PLPHA. Chappell, J. Chrispeels, M.J. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. May 1986. v. 81 (1). p. 50-54. Includes 23 references. (NAL Call No.: DNAL 450 P692).

0239

Use of Alcaligenes eutrophus as a source of genes for 2,4-D resistance in plants.
WEESA6. Perkins, E.J. Stiff, C.M.; Lurquin, P.F. Champaign, Ill. : Weed Science Society of America. Weed science. Paper presented at the "Symposium on Genetic Engineering for Herbicide Resistance," Feb. 1985. 1987. v. 35 (Suppl.1). p. 12-18. Includes references. (NAL Call No.: DNAL 79.8 W41).

0240

Using yield trial data to analyze the physiological genetics of yield accumulation and the genotype X environment interaction effects on yield.
Wallace, D.H. Masaya, P.N. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1988. v. 31. p. vii-xxiv. Includes references. (NAL Call No.: DNAL SB327.A1B5).

0241

Vanadium induced manganese toxicity in bush bean plants grown in solution culture.
JPNUDS. Kohno, Y. New York, N.Y. : Marcel Dekker. Journal of plant nutrition. Oct 1986. v. 9 (10). p. 1261-1272. Includes references. (NAL Call No.: DNAL QK867.J67).

0242

Variation in rust susceptibility in beans: predicting lesion size from leaf developmental stage measured by leaf age, length, and plastochron index.
PHYTA. Shaik, M. Dickinson, T.A.; Steadman, J.R. St. Paul, Minn. : American Phytopathological Society. The importance of controlling for leaf developmental stage at the time of inoculation in studies of lesion size was investigated. Significant differences were obtained between two cultivars, Pompadour Checa and Pinto 650, by regressing lesion size on leaf developmental stage at time of inoculation. Leaf developmental stage was recorded as leaf age (days from unfolding), as leaf length, and by means of a plastochron index. Of these three variables, leaf age and plastochron index were better predictors of lesion size than leaf length. Plastochron index is a superior indicator of leaf development since it integrates chronological age and increase in size and is easier to assess. The results reported here may explain certain aspects of the field resistance of Pompadour Checa. Phytopathology. Oct 1989. v. 79 (10). p. 1035-1042. Includes references. (NAL Call No.: DNAL 464.8 P56).

0243

Variation in virulence of the rust pathogen in the Dominican Republic and high plains of the U.S.: implication for control.
Steadman, J.R. Ramirez, W.; Shaik, M.; Hindman, D.; Coyne, D.P. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. Mar 1986. v. 29. p. 6. (NAL Call No.: DNAL SB327.A1B5).

0244

Virus eradication from a bean germplasm collection.
Klein, R.E. Wyatt, S.D.; Kaiser, W.J. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. Mar 1986. v. 29. p. 37. (NAL Call No.: DNAL SB327.A1B5).

0245

The I gene and broad spectrum potyvirus resistance.
Kyle, M. Dickson, M.H.; Provvidenti, R. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1988. v. 31. p. 146-147. Includes references. (NAL Call No.: DNAL SB327.A1B5).

0246

The effect of host-plant density of the numbers of Mexican bean beetles, Epilachna varivestis.
AMNAA. Turchin, P. Notre Dame, Ind. : University of Notre Dame. American midland naturalist. Jan 1988. v. 119 (1). p. 15-20. ill. Includes references. (NAL Call No.: DNAL 410 M58).

0247

Effect of oil well brine on germination and seedling growth of several crops.
OJSCA. Munn, D.A. Stewart, R. Columbus, Ohio : Ohio Academy of Science. Ohio journal of science. Sept 1989. v. 89 (4). p. 92-94. Includes references. (NAL Call No.: DNAL 410 OH3).

0248

Effects of plant morphology and emergence time on size hierarchy formation in experimental populations of two varieties of cultivated peas (Pisum sativum).
AJBOAA. Ellison, A.M. Rabinowitz, D. Columbus, Ohio : Botanical Society of America. American journal of botany. Mar 1989. v. 76 (3). p. 427-436. ill. Includes references. (NAL Call No.: DNAL 450 AM36).

0249

Maternal investment and fruit abortion in Phaseolus vulgaris.
AJBOA. Nakamura, Robert R. Baltimore, Md. : Botanical Society of America. American journal of botany. July 1986. v. 73 (7). p. 1049-1057. Includes references. (NAL Call No.: DNAL 450 AM36).

0250

Qualitative and quantitative determination of the allelochemical sphere of germinating mung bean.
Tang, C.S. Zhang, B. New York, N.Y. : John Wiley & Sons, c1986. The Science of allelopathy / edited by Alan R. Putnam and Chung-Shih Tang. p. 229-242. ill. Includes references. (NAL Call No.: DNAL QK898.A43S34).

0251

Weed-snap bean competition for light.
PNWSB. Schepps, A.L. Ashley, R.A. Beltsville, Md. : The Society. Proceedings of the ... annual meeting - Northeastern Weed Science Society. 1985. v. 39, p. 77-79. ill. (NAL Call No.: DNAL 79.9 N814).

0252

The beginning of translocation in wound phloem.
Schulz, A. New York : Alan R. Liss. Plant biology. In the series analytic: Phloem Transport / edited by J. Cronshaw, W.J. Lucas and R.T. Giaquinta. Proceedings of an International Conference, August 18-23, 1985, Asilomar, California. 1986. v. 1. p. 183-185. Includes references. (NAL Call No.: DNAL QH301.P535).

0253

Combining ability analyses and relationships among yield, yield components, and architectural traits in dry bean.
CRPSAY. Nienhuis, J. Singh, S.P. Madison, Wis. : Crop Science Society of America. Crop science. Jan/Feb 1986. v. 26 (1). p. 21-27. Includes 27 references. (NAL Call No.: DNAL 64.8 C883).

0254

Comparative leaf morphology of field beans resistant and susceptible to air pollutant ozone.
Baker, D. Rangappa, M.; Benepal, P.S. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1988. v. 31. p. 106-107. Includes references. (NAL Call No.: DNAL SB327.A1B5).

0255

Effect of foliar fertilization by ammonium sulphate, sodium nitrate, and ammonium nitrate on the morphology and metabolism of lentil (Lens esculentus).
PYTLA. Kord, M.A. Corvallis, Or. : Harold N. and Alma L. Moldenke. Phytologia. June 1987. v 63 (2). p. 91-101. Includes references. (NAL Call No.: DNAL 450 P563).

0256

Effects of brassinolide and other natural plant growth regulators on the morphology of pea stem tissue.
PPGGD. Sasse, J.M. Lake Alfred, Fla. : The Society. Proceedings annual meeting - Plant Growth Regulator Society of America. 1987. (14th). p. 30-39. ill. Includes references. (NAL Call No.: DNAL SB128.P5).

0257

Effects of cultivar and flower removal treatments on the temporal distribution of reproductive structures in bean.
CRPSAY. De Moura, R.L. Foster, K.W. Madison, Wis. : Crop Science Society of America. Crop science. Mar/Apr 1986. v. 26 (2). p. 362-367. Includes references. (NAL Call No.: DNAL 64.8 C883).

0258

Effects of dimethazone (FMC 57020) on chloroplast development. I. Ultrastructural effects in cowpea (Vigna unguiculata L.) primary leaves.
PCBPB. Duke, S.O. Paul, R.N. Duluth, Minn. : Academic Press. Pesticide biochemistry and physiology. Feb 1986. v. 25 (1). p. 1-10. ill. Includes references. (NAL Call No.: DNAL SB951.P49).

0259

Effects of plant morphology and emergence time on size hierarchy formation in experimental populations of two varieties of cultivated peas (Pisum sativum).
AJBOAA. Ellison, A.M. Rabinowitz, D. Columbus, Ohio : Botanical Society of America. American journal of botany. Mar 1989. v. 76 (3). p. 427-436. ill. Includes references. (NAL Call No.: DNAL 450 AM36).

0260

Epidermis integrity and epicotyl growth in azuki bean.
JPGRDI. Branca, C. Ricci, D.; Bassi, M. New York, N.Y. : Springer. Journal of plant growth regulation. 1988. v. 7 (2). p. 95-109. ill. Includes references. (NAL Call No.: DNAL QK745.J6).

0261

Field measurement of white mold effects upon dry beans with genetic resistance or upright plant architecture.
CRPSAY. Schwartz, H.F. Casciano, D.H.; Asenga, J.A.; Wood, D.R. Madison, Wis. : Crop Science Society of America. Crop science. July/Aug 1987. v. 27 (4). p. 699-702. Includes references. (NAL Call No.: DNAL 64.8 C883).

0262

Investigations on the effect of ozone on leaves of pinto bean (Phaseolus vulgaris L.) and beech yearlings (Fagus sylvatica L.).
Masuch, G. Kettrup, A. Deerfield Beach, Fla. : VCH Publishers, c1985. Air pollution and plants / edited by Clement Troyanowsky. Presented at the 2nd "European Conference on Chemistry and the Environment," May 21-24, 1984, Lindau, West Germany. p. 142-145. Includes 3 references. (NAL Call No.: DNAL QK751.E97 1984).

0263

Ontogenetic changes and assimilate partitioning in aborting and nonaborting seeds of Phaseolus vulgaris L.
Sage, T.L. Webster, B.D. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1987. v. 30. p. 82. (NAL Call No.: DNAL SB327.A1B5).

0264

Scanning electron microscopy of damage by dust deposits to leaves and petals.
BOGAA. Eveling, D.W. Chicago, Ill. : University of Chicago Press. Botanical gazette. June 1986. v. 147 (2). p. 159-165. ill. Includes references. (NAL Call No.: DNAL 450 B652).

0265

Specific localization of a plant cell wall glycine-rich protein in protoxylem cells of the vascular system.
PNASA. Keller, B. Templeton, M.D.; Lamb, C.J. Washington, D.C. : The Academy. Proceedings of the National Academy of Sciences of the United States of America. Mar 1989. v. 86 (5). p. 1529-1533. ill. Includes references. (NAL Call No.: DNAL 500 N21P).

0266

Aspects of nodule function and plant development in Phaseolus vulgaris L.
Sarath, G. Webster, B.D. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1987. v. 30. p. 18-19. (NAL Call No.: DNAL SB327.A1B5).

0267

Carbohydrate partitioning and nodule function in common bean after heat stress.
CRPSAY. Hernandez-Armenta, R. Wien, H.C.; Eaglesham, A.R.J. Madison, Wis. : Crop Science Society of America. Previous work has shown that daily temperature maxima of 38 degrees C eliminate N2-fixing activity in common bean (Phaseolus vulgaris L.) in less than 3 d. The purpose of this work was to (i) determine if this response is related to diminished supply of C to nodules and (ii) investigate the recovery of nodule function following short-term heat stress. 'Jutiapa' was grown in sand culture at 26/22 degrees C (day/night) until 16 d after planting, then transferred to 38/22 degrees C for 6 d. Acetylene reduction activity (ARA) was eliminated at 38 degrees C, but nodule concentrations of sucrose and glucose at that temperature were equal or higher than at 26 degrees C throughout the 6-d period. Stressed nodules and controls had 127 +/- 12 and 90 +/- 10 mg of starch per g of dry weight, respectively, after 3 d of treatment, which was the largest difference observed. Treated plants tended to have higher levels of sucrose, glucose, and starch in shoots, particularly in stems, than did controls. In a similar experiment, cells of stressed nodules showed loss of cytoplasm and rupture of peribacteroid membranes after 6 d of heat. Recovery of ARA started 1 wk after the removal of the stress; at that point, treated plants and controls had shoot N contents of 30 and 118 mg plant-1, respectively. This N deficiency caused long-lasting alteratiins of plant growth and development. The inhibition of nodule function by high temperature was not related to availability of carbohydrate, but to the breakdown of the bacteria-infected cells. Crop science. Sept/Oct 1989. v. 29 (5). p. 1292-1297. ill. Includes references. (NAL Call No.: DNAL 64.8 C883).

0268

Carbon isotope ratios demonstrate carbon flux for C4 host to C3 parasite.
PLPHA. Press, M.C. Shah, N.; Tuohy, J.H.; Stewart, G.R. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Dec 1987. v. 85 (4). p. 1143-1145. Includes references. (NAL Call No.: DNAL 450 P692).

0269

Cassava-cowpea and cassava-peanut intercropping. III. Nutrient concentrations and removal.
AGJOAT. Mason, S.C. Leihner, D.E.; Vorst, J.J. Madison, Wis. : American Society of Agronomy. Agronomy journal. May/June 1986. v. 78 (3). p. 441-444. Includes references. (NAL Call No.: DNAL 4 AM34P).

0270

Characterization of rhizobia from ineffective alfalfa nodules: ability to nodulate bean plants Phaseolus vulgaris (L.) Savi. .
APMBA. Eardly, B.D. Hannaway, D.B.; Bottomley, P.J. Washington, D.C. : American Society for Microbiology. Applied and environmental microbiology. Dec 1985. v. 50 (6). p. 1422-1427. Includes 40 references. (NAL Call No.: DNAL 448.3 AP5).

0271

Characterization of root hair cell walls as potential barriers to the infection of plants by rhizobia. The carbohydrate component.
PLPHA. Mort, A.J. Grover, P.B. Jr. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Feb 1988. v. 86 (2). p. 638-641. Includes references. (NAL Call No.: DNAL 450 P692).

0272

Critical deficiency and toxicity levels of tissue zinc in relation to cowpea growth and N2 fixation.
JOSHB. Marsh, D.B. Waters, L. Jr. Alexandria, Va. : The Society. Journal of the American Society for Horticultural Science. May 1985. v. 110 (3). p. 365-370. ill. Includes 25 references. (NAL Call No.: DNAL 81 S012).

0273

Effect of fungicide seed treatment and Rhizobium inoculation on chickpea production.
AAREEZ. Welty, L.E. Prestbye, L.S.; Hall, J.A.; Mathre, D.E.; Ditterline, R.L. New York : Springer. Applied agricultural research. 1988. v. 3 (1). p. 17-20. Includes references. (NAL Call No.: DNAL S539.5.A77).

0274

The effect of iron and boron amendments on infection of bean by Fusarium solani.
PHYTA. Guerra, D. Anderson, A.J. St. Paul, Minn. : American Phytopathological Society. Phytopathology. Sept 1985. v. 75 (9). p. 989-991. Includes 10 references. (NAL Call No. DNAL 464.8 P56).

0275

Effect of nitrogen fertilizers and fungicides on white mold disease and yield of pinto beans in North Dakota.
PNDAAZ. Venette, J.R. Albaugh, D.A.; Kemp, S.W. Grand Forks, N.D. : The Academy. Proceedings of the North Dakota Academy of Science. Apr 1985. v. 39. p. 35. Includes references. (NAL Call No.: DNAL 500 N813).

0276

Effect of urea, ammonium and nitrate on foliar absorption of ferric citrate.
JPNUDS. Reed, D.W. New York, N.Y. : Marcel Dekker. Journal of plant nutrition. Paper presented at the "Fourth International Symposium on Iron Nutrition and Interactions in Plants," July 6-9, 1987, University of New Mexico, Albuquerque. June/Nov 1988. v. 11 (6/11). p. 1429-1437. Includes references. (NAL Call No.: DNAL QK867.J67).

0277

Effect of VA mycorrhizae and bark ash on the growth and N2-fixation of two legumes.
Niemi, M. Eklund, M. Philadelphia, Pa. : Balaban Publishers. Symbiosis. Paper presented at the "Symposium on Nitrogen Fixation and Symbiotic Systems," February 28-March 1, 1988, Jerusalem. 1988 v. 6 (1/2). p. 167-180. Includes references. (NAL Call No.: DNAL QH548.S9).

0278

Effects of inoculation rate, rhizobial strain competition, and nitrogen fixation in chickpea.
AGJOAT. Somasegaran, P. Hoben, H.J.; Gurgun, V. Madison, Wis. : American Society of Agronomy. Chickpea (Cicer arietinum L.) is the third most widely cultivated legume in the world, but N-fixation studies addressing its inoculation response and rhizobial strain competition are limited. We investigated N fixation and competition by three strains of chickpea Rhizobium (TAL numbers 480, 620, and 1148) on 'Desi' and 'Kabuli' chickpea genotypes grown in vermiculite and two soils (Ultisol and Oxisol) free of chickpea rhizobia. Chickpea grown in vermiculite was inoculated with single and mixed strains. A three-strain mixture was inoculated at 10, 10(2), 10(4), 10(6), and 10(8) rhizobia per seed on seeds planted in the two soils. Nodulation and N-fixing parameters were significantly different for chikcpea genotypes and rhizobial strains, with no genotype X strain interaction in the vermiculite experiment. TAL 620 was the most competitive strain in both chickpea genotypes. Maximum N fixation in both genotypes was achieved at 10(4) and 10(6) rhizobia per seed in the Ultisol and Oxisol, respectively. Nitrogen fixation by chickpea in response to different inoculation rates was best described by a quadratic model. The three strains of Rhizobium competed differently in the two soils. Competition in the Ultisol was due to significant strain differences and genotype X strain interaction. In the Oxisol, there was no strain competition. Different inoculation rates did not influence strain competition. In general, the Kabuli genotype had a greater N-fixing potential than the Desi. Maximum N fixation in the two soils was a function of the different inoculation rates for both genotypes. Competition among chickpea rhizobia was influenced by the growth medium, chickpea genotypes, and strain differences but not inoculation rates. Agronomy journal. Jan/Feb 1988. v. 80 (1). p. 68-73. Includes references. (NAL Call No.: DNAL 4 AM34P).

0279

Effects of lime type on yields and leaf concentrations of several vegetable crops as related to soil test levels.
JOSHB. Smith, C.B. Demchak, K.T.; Ferretti, P.A. Alexandria, Va. : The Society. Journal of the American Society for Horticultural Science. Nov 1986. v. 111 (6). p. 837-840. Includes references. (NAL Call No.: DNAL 81 S012).

0280

Effects of soil fertility on growth, tuber yield, nodulation and nitrogen fixation of yam bean (Pachyrhizus erosus (L.) Urban) grown on a Typic Eutrustox.
JPNUDS. Lynd, J.Q. Purcino, A.A.C. New York, N.Y. : Marcel Dekker. Journal of plant nutrition. Apr 1987. v. 10 (5). p. 485-500. ill. Includes references. (NAL Call No.: DNAL QK867.J67).

0281

Effects of sulfur dioxide on nitrogen fixation, carbon partitioning, and yield components in snapbean.
JEVQAA. Griffith, S.M. Campbell, W.F. Madison, Wis. : American Society of Agronomy. Journal of environmental quality. Jan/Mar 1987. v. 16 (1). p. 77-80. Includes references. (NAL Call No.: DNAL QH540.J6).

0282

Environmental effects on photosynthesis, nitrogen-use efficiency, and metabolite pools in leaves of sun and shade plants.
PLPHA. Seemann, J.R. Sharkey, T.D.; Wang, J.L.; Osmond, C.B. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. July 1987. v. 84 (3). p. 796-802. Includes references. (NAL Call No.: DNAL 450 P692).

0283

Fertilizer placement effects on growth responses and nutrient uptake of sweet corn, snapbeans, tomatoes and cabbage.
CSOSA2. Smith, C.B. Demchak, K.T.; Ferretti, P.A. New York, N.Y. : Marcel Dekker. Communications in soil science and plant analysis. 1990. v. 21 (1/2). p. 107-123. Includes references. (NAL Call No.: DNAL S590.C63).

0284

Fiber-optic spectrophotometry of cowpea nodules treated with nitrate or ammonium.
CSOSA2. Franco-Vizcaino, E. Deal, W.J.; Jarrell, W.M. New York, N.Y. : Marcel Dekker. Communications in soil science and plant analysis. May 1988. v. 19 (6). p. 691-706. ill. Includes references. (NAL Call No.: DNAL S590.C63).

0285

Field comparison of dinitrogen fixation determined with nitrogen-15-depleted and nitrogen-15-enriched ammonium sulfate in selected inbred backcross lines of common bean.
CRPSAY. St Clair, D.A. Wolyn, D.J.; DuBois, J.; Burris, R.H.; Bliss, F.A. Madison, Wis. : Crop Science Society of America. The field determination of N2 fixation by 15N-isotopic methods provides a direct and precise measure of N2 fixation. Since 15N-enriched fertilizers are expensive, 15N-depleted (NH4)2SO4 was used as a more economical, readily available alternative to determine N2 fixation in common bean, Phaseolus vulgaris L. The objectives of this study were to determine whether 15N-depleted (NH4)2SO4 provided reliable estimates of relative differences in N2 fixation among bean lines comparable to those obtained using 15N-enriched (NH4)2SO4, and whether nine previously selected progeny lines differed from their respective recurrent parents for N2 fixation ability. The nine progeny lines and three parents were grown in two randomized complete block field experiments that were treated identically except that each experiment received only one of the 15N fertilizers. Lines were harvested at an early reproductive stage (R3) and maturity (R9), partitioned into plant parts, and the 15N and total N yield of the tissue determined. The two 15N fertilizers produced comparable differences among lines at R9 stage based on significant genotypic rank correlations between the two experiments, and similar fertilizer use efficiency values (% FUE). Three of the five selected progeny lines from population 24 fixed significantly more N2 than their recurrent parent 'Sanilac'. The four progeny lines from population 21 were not significantly different from or less effective in N2 fixation than their recurrent parent 'Porrillo Sintetico' therefore, either previous selection based on indirect measures of N2 fixation was not effective, or the two parents did not differ genetically for N2 fixation. In all progeny and parental lines, seed N2 fixed was positively rank correlated with plant N2 fixed, and the highest N2-fixing lines in both populations had more fixed N2 in the seeds than did low N2-fixing lines. Crop science. Sept/Oct 1988. v. 28 (5). p. 773-778. Includes references. (NAL Call No.: DNAL 64.8 C883).

0286

The influence of aluminum on the uptake and release of sucrose by bean leaf tissue.
Hoddinott, J. New York : Alan R. Liss. Plant biology. In the series analytic: Phloem Transport / edited by J. Cronshaw, W.J. Lucas and R.T. Giaquinta. Proceedings of an International Conference, August 18-23, 1985, Asilomar, California. 1986. v. 1. p. 23-26. Includes references. (NAL Call No.: DNAL QH301.P535).

0287

Influence of mycorrhizal fungi and Rhizobium inoculation on chickpea and growth characteristics of lumen bacteria.
Varma, A.K. Singh, K.; Peck, H.D. Jr. Corvallis, Or. : Oregon State University , Forest Research Laboratory, 1985. Proceedings of the 6th North American Conference on Mycorrhizae : June 25-29, 1984, Bend, Oregon / compiled and edited by Randy Molina ; sponsoring institutions, Oregon State University, College of Forestry, and USDA. p. 234. ill. Includes references. (NAL Call No.: DNAL aQK604.N6 1984).

0288

Influence of short periods of heat stress on nitrogen fixation and growth of Phaseolus vulgaris L.
Hernandez-Armenta, R. Wien, H.C.; Eaglesham, A.R.J. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1987. v. 30. p. 50-51. Includes references. (NAL Call No.: DNAL SB327.A1B5).

0289

Influence of total soluble salt concentration on growth and elemental concentration of winged bean seedlings, Psophocarpus tetragonolobus (L.) DC.
CSOSA2. Csizinszky, A.A. New York, N.Y. : Marcel Dekker. Communications in soil science and plant analysis. Sept 1986. v. 17 (9). p. 1009-1018. Includes references. (NAL Call No.: DNAL S590.C63).

0290

Inhibitory effect of pseudobactin on the uptake of iron by higher plants.
APMBA. Becker, J.O. Hedges, R.W.; Messens, E. Washington, D.C. : American Society for Microbiology. Applied and environmental microbiology. May 1985. v. 49 (5). p. 1090-1093. ill. Includes 25 references. (NAL Call No.: DNAL 448.3 AP5).

0291

Interactions between nitrate reduction and nitrogen fixation in grain legumes.
Neyra, C.A. Stephens, B.D. Rockville, Md. : American Society of Plant Physiologists, c1985. Exploitation of physiological and genetic variability to enhance crop productivity / edited by James E. Harper, Lawrence E. Schrader, and Robert W. Howell.`Literature review. p. 12-22. Includes 59 references. (NAL Call No.: DNAL SB189.4.E97).

0292

Iron metabolism in higher plants: the influence of nutrient iron on bean leaf lipoxygenase.
JPNUDS. Boyer, R.F. VanderPloeg, J.R. New York, N.Y. : Marcel Dekker. Journal of plant nutrition. 1986. v. 9 (12). p. 1585-1600. Includes 30 references. (NAL Call No.: DNAL QK867.J67).

0293

Maximum temperature for nitrogen fixation in common bean.
CRPSAY. Hernandez-Armenta, R. Wien, H.C.; Eaglesham, A.R.J. Madison, Wis. : Crop Science Society of America. The upper temperature limit for nodulation and N2 fixation by common bean (Phaseolus vulgaris L.) is not well defined. Controlled environment experiments were conducted to address this issue and to determine the relative importane of shoot and root temperatures. Bean cultivars Redkloud and Jutiapa were grown in sand culture and exposed to day temperatures (13 h d-1) of 26, 32, and 38 degress C from sowing or 26, 32, 34, 36, and 38 degrees C for 5 to 10 days during vegetative growth. In other experiments, day shoot-root temperatures of 26-26, 26-38, 38-26, and 38-38 degrees C were compared. Night temperature was 22 degreesC in all instances. Transferring plants from a 26 degrees C to a 38 degrees C environment resulted in elimination of acetylene reduction activity (ARA) (controls reached over 12 nmol plant-1 s-1), severe N deficiency (55 +/- 3 mg shoot-N plant-1 after 10 d compared with 177 +/- 7 mg in controls), and virtual cessation of leaf expansion. Ten days at 32 degrees C decreased (P less than or equal to 0.05) shoot-N content relative to controls. Nodulation was inhibited at 38 degrees C when treatment was started immediately after inoculation of established plants or seeds but not when it was applied after nodules were initiated. At root temperature of 38 degrees C, N2 fixation was inhibited regardless of shoot temperature. Conversely, at root temperature of 26 degrees C, nodulation and shoot-N accumulation were unaffected even when shoot temperature was 38 degrees C. It appears that only high soil temperature would constrain N2 fixation by bean: the critical temperature was 32 degress C for nodule function and 38 degrees C for nodulation. Crop science. Sept/Oct 1989. v. 29 (5). p. 1260-1265. Includes references. (NAL Call No.: DNAL 64.8 C883).

0294

Mechanism of manganese toxicity and tolerance of plants. VII. Effect of light intensity on manganese-induced chlorosis.
JPNUDS. Horiguchi, T. New York, N.Y. : Marcel Dekker. Journal of plant nutrition. Mar 1988. v. 11 (3). p. 235-246. ill. Includes references. (NAL Call No.: DNAL QK867.J67).

0295

Narrow- and broad-host-range symbiotic plasmids of Rhizobium spp. strains that nodulate Phaseolus vulgaris.
APMBA. Brom, S. Martinez, E.; Davila, G.; Palacios, R. Washington, D.C. : American Society for Microbiology. Abstract: Agrobacterium transconjugants containing symbiotic plasmids from different Rhizobium spp. strains that nodulate Phaseolus vulgaris were obtained. All transconjugants conserved the parental nodulation host range. Symbiotic (Sym) plasmids of Rhizobium strains isolated originally from P. vulgaris nodules, which had a broad nodulation host range, and single-copy nitrogenase genes conferred a Fix+ phenotype to the Agrobacterium transconjugants. A Fix- phenotype was obtained with Sym plasmids of strains isolated from P. vulgaris nodules that had a narrow host range and reiterated nif genes, as well as with Sym plasmids of strains isolated from other legumes that presented single nif genes and a broad nodulation host range. This indicates that different types of Sym plasmids can confer the ability to establish an effective symbiosis with P. vulgaris. Applied and Environmental microbiology. May 1988. v. 54 (5). p. 1280-1283. ill. Includes references. (NAL Call No.: DNAL 448.3 AP5).

0296

Nitrate utilization and dinitrogen fixation (acetylene reduction) by nitrate reductase-deficient mutants of pea.
CRPSAY. Vigue, G.T. Warner, R.L. Madison, Wis. : Crop Science Society of America. Crop science. May/June 1987. v. 27 (3). p. 548-522. Includes references. (NAL Call No.: DNAL 64.8 C883).

0297

Nitrogen nutrition of nodules in relation to 'N-hunger' in cowpea (Vigna unguiculata L. Walp).
PLPHA. Atkins, C.A. Pate, J.S.; Sanford, P.J.; Dakora, F.D.; Matthews, I. Rockville, Md. : American Society of Plant Physiologists. Early growth, nodule development, and nitrogen fixation by two cultivars of cowpea (Vigna unguiculate L. Walp), one large-seeded (Vita 3; 146.0 +/- 0.9 milligrams seed dry weight, 4.1 +/- 0.2 milligrams seed N), the other small-seeded (Caloona; 57.5 +/- 2.5 milligrams seed dry weight, 1.8 +/- 0.1 milligrams seed N), were compared under conditions of sand culture with nutrient solution free of combined N. The seed stocks used had been obtained from plants uniformly labeled with 15N, thus enabling changes with time in distribution of cotyledon and fixed N among plant parts to be measured by isotope dilution. Caloona, but not Vita 3, showed physiological symptoms of 'N hunger,' i.e. transient loss of chlorophyll (visible yellowing) and from the first-formed unifoliolate leaves at or around the onset of symbiotic functioning and N2 fixation. The smaller-seeded Caloona showed higher early nitrogenase activity than the larger-seeded Vita 3 and by 28 days had fixed 6.6 milligrams of N per milligram of seed N mg N . (mg seed N)-1 versus only 3.5 mg N . (mg seed N)-1 in Vita 3. Both cultivars lost around 30% of their initial seed at germination, mostly as fallen cotyledons. Abscised cotyledons of Caloona contained 1.21 +/- 0.17% N; those of Vita 3 contained 2.61 +/- 0.37% N. When compared on the basis of cotyledon N available for seedling growth, Caloona was shown to have fixed 10.6 mg N . (mg seed N)-1 and Vita 3 only 5.3 mg N . (mg seed N)-1. Most of the cotyledon N withdrawn from the unifoliolate leaf pair of Caloona during 'N-hunger' was committed to early nodule growth and, in total, 20 to 25% of the cotyledon N resource of this cultivar was ultimately invested in establishment of symbiosis compared with only 7% in Vita 3. Plant physiology. Aug 1989. v. 90 (4). p. 1644-1649. Includes references. (NAL Call No.: DNAL 450 P692).

0298

Nodulation and nitrogen fixation efficacy of Rhizobium fredii with Phaseolus vulgaris genotypes.
APMBA. Sadowsky, M.J. Cregan, P.B.; Keyser, H.H. Washington, D.C. : American Society for Microbiology. Phaseolus plant introduction (PI) genotypes (consisting of 684 P. vulgaris, 26 P. acutifolius, 39 P. lunatus, and 5 P. coccineus accessions) were evaluated for their ability to form effective symbioses with strains of six slow-growing (Bradyrhizobium) and four fast-growing (Rhizobium fredii) soybean rhizobia. Of the 684 P. vulgaris genotypes examined, three PIs were found to form effective nitrogen-fixing symbioses with the R. fredii strains. While none of the Bradyrhizobium strains nodulated any of the genotypes tested, some produced large numbers of undifferentiated root proliferations (hypertrophies). A symbiotic plasmid-cured R. fredii strain failed to nodulate the P. vulgaris PIs and cultivars, suggesting that P. vulgaris host range genes are Sym plasmid borne in the fast-growing soybean rhizobia. Applied and environmental microbiology. Aug 1988. v. 54 (8). p. 1907-1910. Includes references. (NAL Call No.: DNAL 448.3 AP5).

0299

Nodulation, nitrogen fixation, and hydrogen oxidation by pigeon pea Bradyrhizobium spp. in symbiotic association with pigeon pea, cowpea, and soybean.
APMBA. Nautiyal, C.S. Hegde, S.V.; Berkum, P. van. Washington, D.C. : American Society for Microbiology. Astract: The pigeon pea strains of Bradyrhizobium CC-1, CC-8, UASGR(S), and F4 were evaluated for nodulation, effectiveness for N2 fixation, and H2 oxidation with homologous and nonhomologous host plants. Strain CC-1 nodulated Macroptilium atropurpureum, Vigna unguiculata, Glycine max, and G. soja but did not nodulate Pisum sativum, Phaseolus vulgaris, Trigonella foenum-graecum, and Trifolium repens. Strain F4 nodulated G. max cv. Peking and PI 434937 (Malayan), but the symbioses formed were poor. Similarly, G. max cv. Peking, cv. Bragg, PI 434937, PR 13-28-2-8-7, and HM-1 were nodulated by strain CC-1, and symbioses were also poor. G. max cv. Williams and cv. Clark were not nudulated. H2 uptake activity was expressed with pigeonpea and cowpea, but not with soybean. G. max cv. Bragg grown in Bangalore, India, in local soil not previously exposed to Bradyrhizobium japonicum formed nodules with indigenous Bradyrhizobium spp. Six randomly chosen isolates, each originating from a different nodule, formed effective symbioses with pigeon pea host ICPL-407, nodulated PR 13-28-2-8-7 soybean forming moderately effective symbioses, and did not nodulate Williams soybean. These results indicate the six isolates to be pigeon pea strains although they originated from soybean nodules. Host-determined nodulation of soybean by pigeon pea Bradyrhizobium spp. may depend upon the ancestral backgrounds of the cultivars. The poor symbioses formed by the pigeon pea strains with soybean indicate that this crop should be inoculated with B. japonicum for its cultivation in soils containing only pigeon pea Bradyrhizobium spp. Applied and Environmental microbiology. Jan 1988. v. 54 (1). p. 94-97. Includes references. (NAL Call No.: DNAL 448.3 AP5).

0300

Partitioning of nitrogen-15-labeled biologically fixed nitrogen and nitrogen-15-labeled nitrate in cowpea during pod development.
AGJOAT. Douglas, L.A. Weaver, R.W. Madison, Wis. : American Society of Agronomy. Agronomy journal. May/June 1986. v. 78 (3). p. 499-502. Includes references. (NAL Call No.: DNAL 4 AM34P).

0301

Performance of mungbean, cowpea, and soybean cut for greenchop, silage, and hay and effects of seed inoculation on forage yield and quality.
Morris, D.R. Nelson, D.B.; Friesner, D.L.; Barber, B.W. Baton Rouge? , La. : The Station Annual progress report - Southeast Research Station, Louisiana Agricultural Experiment Station. 1988. p. 43-47. (NAL Call No.: DNAL S67.E22).

0302

Phaseolus vulgaris growth in an ammonium-based nutrient solution with variable calcium.
AGJOAT. Fenn, L.B. Taylor, R.M.; Horst, G.L. Madison, Wis. : American Society of Agronomy. Agronomy journal. Jan/Feb 1987. v. 79 (1). p. 89-91. Includes references. (NAL Call No.: DNAL 4 AM34P).

0303

Phytohormones, Rhizobium mutants, and nodulation in legumes. VII. Identification and quantification of cytokinins in effective and ineffective pea root nodules using radioimmunoassay.
JPGRDI. Badenoch-Jones, J. Parker, C.W.; Letham, D.S. New York, N.Y. : Springer. Journal of plant growth regulation. 1987. v. 6 (2). p. 97-111. ill. Includes references. (NAL Call No.: DNAL QK745.J6).

0304

Pod retention and seed yield of beans in response to chemcial foliar applications.
HJHSA. Weaver, M.L. Timm, H.; Ng, H.; Burke, D.W.; Silbernagel, M.J.; Foster, K. Alexandria, Va. : American Society for Horticultural Science. HortScience. June 1985. v. 20 (3,sectionI). p. 429-431. Includes 16 references. (NAL Call No.: DNAL SB1.H6).

0305

The relationship between H2 evolution and acetylene reduction in Pisum sativum-Rhizobium leguminosarum symbioses differing in uptake hydrogenase activity.
PLPHA. Mahon, J.D. Nelson, L.M. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Sept 1986. v. 82 (1). p. 154-159. Includes 20 references. (NAL Call No.: DNAL 450 P692).

0306

Rhizobium leguminosarum exopolysaccharide mutants: biochemical and genetic analyses and symbiotic behavior on three hosts.
JOBAAY. Diebold, R. Noel, K.D. Washington, D.C. : American Society for Microbiology. Ten indenpendently generated mutants of Rhizobium leguminosarum biovar phaseoli CFN42 isolated after Tn5 mutagenesis formed nonmucoid colonies on all agar media tested and lacked detectable production of the normal acidic exopolysaccharide in liquid culture. The mutants were classified into three groups. Three mutants harbored Tn5 insertions on a 3.6-kilobase-pair EcoRI fragment and were complemented to have normal exopolysaccharide production by cosmids that shared an EcoRI fragment of this size from the CFN42 genome. The Tn5 inserts of five other mutants appeared to be located on a second, slightly smaller EcoRI fragment. Attempts to complement mutants of this second group with cloned DNA were unsuccessful. The mutations of the other two mutants were located in apparently adjacent EcoRI fragments carried on two cosmids that complemented those two mutants. The latter two mutants also lacked O-antigen-containing lipopolysaccharides and induced underdeveloped nodules that lacked nitrogenase activity on bean plants. The other eight mutants had normal lipopolysaccharides and wild-type symbiotic proficiencies on bean plants. Mutants in each of these groups were mated with R. leguminosarum strains that nodulated peas (R. leguminosarum biovar viciae) or clovers (R. leguminosarum biovar trifolii). Transfer of the Tn5 mutations resulted in exopolysaccharide-deficient R. leguminosarum biovar viciae or R. leguminosarum biovar trifolii transconjugants that were symbiotically deficient in all cases. These results support earlier suggestions that successful symbiosis with peas or clovers requires that rhizobia be capable of acidic exopolysaccharide production, whereas symbiosis with beans does not have this requirement. Journal of bacteriology. Sept 1989. v. 171 (9). p. 4821-4830. ill. Includes references. (NAL Call No.: DNAL 448.3 J82).

0307

Rhizosphere acidification by iron deficient bean plants: the role of trace amounts of divalent metal ions. A study on roots of intact plants with the use of 11C- and 31P-NMR.
PLPHA. Bienfait, H.F. Lubberding, H.J.; Heutink, P.; Lindner, L.; Visser, J.; Kaptein, R.; Dijkstra, K. Rockville, Md. : American Society of Plant Physiologists. Rhizosphere acidification by Fe-deficient bean (Phaseolus vulgaris L.) plants was induced by trace amounts of divalent metal ions (Zn, Mn). The induction of this Fe-efficiency reaction was studied by 14CO2 and 11CO2 fixation experiments, and with 31P-NMR on roots of whole plants. The starting and ending of an acidification cycle was closely coupled to parallel changes in CO2 fixation, within the maximal resolution capacity of 20 min. 31P-NMR experiments on intact root systems showed one

peak which was ascribed to vacuolar free phosphate. At the onset of proton extrusion this peak shifted, indicating increase of pH in the cells. Proton extrusion was inhibited, with a lag period of 2 hours, by the protein synthesis inhibitors cycloheximide and hygromycin. It is assumed that Zn and Mn induce proton extrusion in Fe-deficient bean roots by activating the synthesis of a short-living polypeptide; the NMR data suggest a role for this peptide in the functioning of a proton pumping ATPase in the plasma membrane. Plant physiology. May 1989. v. 90 (1). p. 359-364. Includes references. (NAL Call No.: DNAL 450 P692).

0308

Rhizosphere physiology of crested wheatgrass and legume seedlings: root-shoot carbohydrate interactions.
JPNUDS. Bennett, J.H. Chatterton, N.J.; Harrison, P.A. New York, N.Y. : Marcel Dekker. Journal of plant nutrition. Paper presented at the "Fourth International Symposium on Iron Nutrition and Interactions in Plants," July 6-9, 1987, University of New Mexico, Albuquerque. June/Nov 1988. v. 11 (6/11). p. 1099-1116. ill. Includes references. (NAL Call No.: DNAL QK867.J67).

0309

Sodium stimulation of uptake hydrogenase activity in symbiotic Rhizobium.
PLPHA. Kapulnik, Y. Phillips, D.A. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Oct 1986. v. 82 (2). p. 494-498. Includes references. (NAL Call No.: DNAL 450 P692).

0310

Soil fertility effects on growth, nitrogen fixation, nodule enzyme activity and xylem exudates of Lablab purpureus (L.) Sweet, grown on a Typic Eutrustox.
CSOSA2. Purcino, A.A.C. Lynd, J.Q. New York, N.Y. : Marcel Dekker. Communications in soil science and plant analysis. 1986. v. 17 (12). p. 1331-1354. ill. Includes references. (NAL Call No.: DNAL S590.C63).

0311

Specific mRNA and rRNA levels in greening pea leaves during recovery from iron strees.
PLPHA. Spiller, S.C. Kaufman, L.S.; Thompson, W.F.; Briggs, W.R. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. June 1987. v. 84 (2). p. 409-414. Includes references. (NAL Call No.: DNAL 450 P692).

0312

VA mycorrhizal inoculation increases growth and phosphorus uptake of cluster beans.
Surender, N. Babu, R.S.H.; Krishna, K.R.; Singh, B.G. Corvallis, Or. : Oregon State University , Forest Research Laboratory, 1985. Proceedings of the 6th North American Conference on Mycorrhizae : June 25-29, 1984, Bend, Oregon / compiled and edited by Randy Molina ; sponsoring institutions, Oregon State University, College of Forestry, and USDA. p. 405. Includes references. (NAL Call No.: DNAL aQK604.N6 1984).

0313

Abscisic acid accumulation by in situ and isolated guard cells of Pisum sativum L. and Vicia faba L. in relation to water stress.
PLPHA. Cornish, K. Zeevaart, J.A.D. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Aug 1986. v. 81 (4). p. 1017-1021. ill. Includes references. (NAL Call No.: DNAL 450 P692).

0314

Accumulation of polychlorobiphenyl congeners and p,p-DDE at environmental concentrations by corn and beans.
EESAD. Shane, L.A. Bush, B. Duluth, Minn. : Academic Press. Ecotoxicology and environmental safety. Feb 1989. v. 17 (1). p. 38-46. Includes references. (NAL Call No.: DNAL QH545.A1E29).

0315

Alteration of extracellular enzymes in pinto bean leaves upon exposure to air pollutants, ozone and sulfur dioxide.
PLPHA. Peters, J.L. Castillo, F.J.; Heath, R.L. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Jan 1989. v. 89 (1). p. 159-164. Includes references. (NAL Call No.: DNAL 450 P692).

0316

Aluminum tolerances of two snapbean cultivars related to organic acid content evaluated by high-performance liquid chromatography.
JPNUDS. Lee, E.H. Foy, C.D. New York, N.Y. : Marcel Dekker. Journal of plant nutrition. 1986. v. 9 (12). p. 1481-1498. ill. Includes 11 references. (NAL Call No.: DNAL QK867.J67).

0317

Analysis of carbohydrates in the common bean plant (Phaseolus vulgaris L.) under drought conditions.
Osuna Garcia, J.A. Ortega Delgado, M.L.; Munoz Orozco, A. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1987. v. 30. p. 9. (NAL Call No.: DNAL SB327.A1B5).

0318

Antiethylene properties of AgNO3 and 2,5-norbornadiene in light and dark in Vigna radiata.
JPGRDI. Curtis, R.W. New York, N.Y. : Springer. Journal of plant growth regulation. 1987. v. 6 (1). p. 41-56. Includes references. (NAL Call No.: DNAL QK745.J6).

0319

Antifungal hydrolases in pea tissue. II. Inhibition of fungal growth by combinations of chitinase and beta-1,3-glucanase.
PLPHA. Mauch, F. Mauch-Mani, B.; Boller, T. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Nov 1988. v. 88 (3). p. 936-942. ill. Includes references. (NAL Call No.: DNAL 450 P692).

0320

Antigenic crossreactivity between bacterial and plant cytochrome P-450 monoxygenases.
PLPHA. Stewart, C.B. Schuler, M.A. Rockville, Md. : American Society of Plant Physiologists. Although cytochrome P-450 monoxygenases mediate critical reactions in plant microsomes, characterization of their activities has been difficult due to their inherent instability and the lack of a crossreacting P-450 antibody. We have surveyed the effects of protein stabilizing agents on t-cinnamic acid hydroxylase (t-CAH), a prominent microsomal P-450, and on total P-450 monoxygenase content. Trans-cinnamic acid is the most effective protecting agent for t-CAH activity. Leupeptin, a broad spectrum protease inhibitor, stabilizes t-CAH activity and increases the apparent P-450 content more than serine protease inbibitors such as phenylmethylsulfonyl fluoride. The combination of t-cinnamic acid and protease inhibitors increase the level of detectable t-CAH activity 4- to 14-fold over the levels detected by previously published procedures. In order to estimate the molecular weights and diversity of the plant P-450 monoxygenases in wounded pea epicotyls, we have prepared two polyclonal antibodies against the Pseudomonas putida camphor hydroxylase (P-450cam). One of the heterologous antibodies cross-reacts with constitutive microsomal polypeptides between 52 and 54 kilodaltons and several pea (Pisum sativum L.) mitochondrial proteins between 47 and 48 kilodaltons. The other polyclonal antibody cross-reacts strongly with two wound-induced polypeptides (65 and 47 kilodaltons) and weakly with one constitutive polypeptide (58 kilodaltons). We conclude that at least two subclasses of plant P-450 monoxygenases share common epitopes with the bacterial P-450 enzyme. Plant physiology. June 1989. v. 90 (2). p. 534-541. ill. Includes references. (NAL Call No.: DNAL 450 P692).

0321

Application of the disk method: responses to growth regulators.
JPGRDI. Anderson, D.R. Camper, N.D. New York, N.Y. : Springer. Journal of plant growth regulation. 1987. v. 6 (1). p. 57-65. ill. Includes references. (NAL Call No.: DNAL QK745.J6).

0322

Aspects of nodule function and plant development in Phaseolus vulgaris L.
Sarath, G. Webster, B.D. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1987. v. 30. p. 18-19. (NAL Call No.: DNAL SB327.A1B5).

0323

Auxin and fusicoccin enhancement of beta-glucan synthase in peas. An intracellular enzyme activity apparently modulated by proton extrusion.
PLPHA. Ray, P.M. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. July 1985. v. 78 (3). p. 466-472. Includes 41 references. (NAL Call No.: DNAL 450 P692).

0324

Auxin effects on the correlative interaction among fruits in Phaseolus vulgaris L.
PPGGD. Tamas, I.A. Koch, J.L.; Mazur, B.K.; Davies, P.J. Lake Alfred : The Society. Proceedings annual meeting - Plant Growth Regulator Society of America. 1986. (13th). p. 208-215. Includes references. (NAL Call No.: DNAL SB128.P5).

0325

The beginning of translocation in wound phloem.
Schulz, A. New York : Alan R. Liss. Plant biology. In the series analytic: Phloem Transport / edited by J. Cronshaw, W.J. Lucas and R.T. Giaquinta. Proceedings of an International Conference, August 18-23, 1985, Asilomar, California. 1986. v. 1. p. 183-185. Includes references. (NAL Call No.: DNAL QH301.P535).

0326

Biological and biochemical effects of cytokinin-active phenylurea derivatives in tissue culture systems.
HJHSA. Mok, M.C. Mok, D.W.S.; Turner, J.E.; Mujer, C.V. Alexandria, Va. : American Society for Horticultural Science. HortScience. Paper presented at the symposium on "Chemical Regulation in Tissue Culture: An Overview," held at the 22nd International Horticultural Congress/83rd ASHS Annual Meeting, August 15, 1986, Davis, California. Dec 1987. v. 22 (6). p. 1194-1197. ill. Includes references. (NAL Call No.: DNAL SB1.H6).

0327

Biosynthesis and regulation of a sulfur-rich albumin in pea seeds.
NASSD. Higgins, T.J.V. Blagrove, R.J.; Chandler, P.M.; Randall, P.J.; Beach, L.R.; Spencer, D.; Inglis, A.S.; Detering, R. New York, N.Y. : Plenum Press. NATO advanced science institutes series : Series A : Life sciences. Paper presented at the congress on the "Molecular Form and Function of the Plant Genome," July 4-14, 1984, Renesse, Netherlands. 1985. v. 83. p. 531-541. ill. Includes references. (NAL Call No.: DNAL QH301.N32).

0328

Biosynthesis of ethylene and its regulation in plants.
Imaseki, H. Nakajima, N.; Todaka, I. Dordrecht : Kluwer Academic, 1988. Biomechanisms regulating growth and development : invited papers presented at a symposium held May 3-7, 1987, at the Beltsville Agricultural Research Center (BARC), Beltsville, MD / G.L. Steffens and T.S. Rumsey, editors. p. 205-227. ill. Includes references. (NAL Call No.: DNAL QH491.B47).

0329

Biosynthetic cause of in vivo acquired thermotolerance of photosynthetic light reactions and metabolic responses of chloroplasts to heat stress.
PLPHA. Suss, K.H. Yordanov, I.T. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. May 1986. v. 81 (1). p. 192-199. Includes 32 references. (NAL Call No.: DNAL 450 P692).

0330

Breeding for heat tolerance--an approach based on whole-plant physiology.
HJHSA. Hall, A.E. Alexandria, Va. : American Society for Horticultural Science. HortScience. Paper presented at the "Symposium on Plant-Environment Interactions from Subcellular to Plant Community," August 13, 1986, Davis, California. Jan 1990. v. 25 (1). p. 17-18. Includes references. (NAL Call No.: DNAL SB1.H6).

0331

Butachlor influence on selected metabolic processes of plant cells and tissues.
JPGRDI. Chang, S.S. Ashton, F.M.; Bayer, D.E. New York, N.Y. : Springer. Journal of plant growth regulation. 1985. v. 4 (1). p. 1-9. Includes references. (NAL Call No.: DNAL QK745.J6).

0332

Calcium inhibition of the acid response in pea epicotyl.
Barkley, G.M. Coe, L.L. Columbia, Mo. : The Interdisciplinary Plant Biochemistry and Physiology Program. Current topics in plant biochemistry and physiology : Proceedings of the ... Plant Biochemistry and Physiology Symposium held at the University of Missouri, Columbia. 1985. v. 4. p. 226. Includes 11 references. (NAL Call No.: DNAL QK861.P55).

0333

Carbohydrate partitioning and nodule function in common bean after heat stress.
CRPSAY. Hernandez-Armenta, R. Wien, H.C.; Eaglesham, A.R.J. Madison, Wis. : Crop Science Society of America. Previous work has shown that daily temperature maxima of 38 degrees C eliminate N2-fixing activity in common bean (Phaseolus vulgaris L.) in less than 3 d. The purpose of this work was to (i) determine if this response is related to diminished supply of C to nodules and (ii) investigate the recovery of nodule function following short-term heat stress. 'Jutiapa' was grown in sand culture at 26/22 degrees C (day/night) until 16 d after planting, then transferred to 38/22 degrees C for 6 d. Acetylene reduction activity (ARA) was eliminated at 38 degrees C, but nodule concentrations of sucrose and glucose at that temperature were equal or higher than at 26 degrees C throughout the 6-d period. Stressed nodules and controls had 127 +/- 12 and 90 +/- 10 mg of starch per g of dry weight, respectively, after 3 d of treatment, which was the largest difference observed. Treated plants tended to have higher levels of sucrose, glucose, and starch in shoots, particularly in stems, than did controls. In a similar experiment, cells of stressed nodules showed loss of cytoplasm and rupture of peribacteroid membranes after 6 d of heat. Recovery of ARA started 1 wk after the removal of the stress; at that point, treated plants and controls had shoot N contents of 30 and 118 mg plant-1, respectively. This N deficiency caused long-lasting alteratiins of plant growth and development. The inhibition of nodule function by high temperature was not related to availability of carbohydrate, but to the breakdown of the bacteria-infected cells. Crop science. Sept/Oct 1989. v. 29 (5). p. 1292-1297. ill. Includes references. (NAL Call No.: DNAL 64.8 C883).

0334

Carbohydrate substrate specificity of bacterial and plant pyrophosphate-dependent phosphofructokinases.
BICHA. Bertagnolli, B.L. Younathan, E.S.; Voll, R.J.; Pittman, C.E.; Cook, P.F. Washington, D.C. : American Chemical Society. Biochemistry. Aug 12, 1986. v. 25 (16). p. 4674-4681. Includes references. (NAL Call No.: DNAL 381 B523).

0335

Carbon dioxide and light responses of photosynthesis in cowpea and pigeonpea during water deficit and recovery.
PLPHA. Lopez, F.B. Setter, T.L.; McDavid, C.R. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Dec 1987. v. 85 (4). p. 990-995. Includes references. (NAL Call No.: DNAL 450 P692).

0336

Carbon isotope ratios demonstrate carbon flux for C4 host to C3 parasite.
PLPHA. Press, M.C. Shah, N.; Tuohy, J.H.; Stewart, G.R. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Dec 1987. v. 85 (4). p. 1143-1145. Includes references. (NAL Call No.: DNAL 450 P692).

0337

Cassava-cowpea and cassava-peanut intercropping. II. Leaf area index and dry matter accumulation.
AGJOAT. Mason, S.C. Leihner, D.E.; Vorst, J.J.; Salazar, E. Madison, Wis. : American Society of Agronomy. Agronomy journal. Jan/Feb 1986. v. 78 (1). p. 47-53. Includes references. (NAL Call No.: DNAL 4 AM34P).

0338

Cassava-cowpea and cassava-peanut intercropping. III. Nutrient concentrations and removal.
AGJOAT. Mason, S.C. Leihner, D.E.; Vorst, J.J. Madison, Wis. : American Society of Agronomy. Agronomy journal. May/June 1986. v. 78 (3). p. 441-444. Includes references. (NAL Call No.: DNAL 4 AM34P).

0339

Cellular basis for dimethipin-induced loss of leaf turgor and desiccation.
JPGRDI. Metzger, J.D. Keng, J. New York, N.Y. : Springer. Journal of plant growth regulation. 1987. v. 6 (1). p. 33-40. ill. Includes references. (NAL Call No.: DNAL QK745.J6).

0340

Changes in carbohydrate composition in wheat and pea seedlings induced by calcium deficiency.
PLPHA. Veierskov, B. Meravy, L. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Sept 1985. v. 79 (1). p. 315-317. Includes 20 references. (NAL Call No.: DNAL 450 P692).

0341

Changes in selected biochemical components, in vitro protein digestibility and amino acids in two bean cultivars during germination.
JFDAZ. Chang, K.C. Harrold, R.L. Chicago, Ill. : The Institute. This study investigates changes in lectin and trypsin inhibitor activity, SDS-PAGE peptide pattern, in vitro protein digestibility and amino acid composition during germination of two dry bean cultivars. Lectin activity in navy beans was reduced. Significant amounts of trypsin inhibitor activity in both navy and pinto beans remained after germination for 6 days. Glycopeptides, with molecular mass ranging from 25,000 to 27,000 daltons, from partial proteolysis of the major storage proteins were resistant to a multienzyme system. In vitro protein digestibility and amino acid composition were only slightly altered. Germination did not improve protein nutritional quality of dry beans. Journal of food science : an official publication of the Institute of Food Technologists. May/June 1988. v. 53 (3). p. 783-787, 804. ill. Includes references. (NAL Call No.: DNAL 389.8 F7322).

0342

Changes in the levels of major sulfur metabolites and free amino acids in pea cotyledons recovering from sulfur deficiency.
PLPHA. Macnicol, P.K. Randall, P.J. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Feb 1987. v. 83 (2). p. 354-359. Includes references. (NAL Call No.: DNAL 450 P692).

0343

Changes in two forms of membrane-associated cellulase during ethylene-induced abscission.
PLPHA. Campillo, E. del. Durbin, M.; Lewis, L.N. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Nov 1988. v. 88 (3). p. 904-909. ill. Includes references. (NAL Call No.: DNAL 450 P692).

0344

Characterization of a xylose-specific antiserum that reacts with the complex asparagine-linked glycans of extracellular and vacuolar glycoproteins.
PLPHA. Lauriere, M. Lauriere, C.; Chrispeels, M.J.; Johnson, K.D.; Sturm, A. Rockville, Md. : American Society of Plant Physiologists. Antibodies were raised against carrot (Daucus carota) cell wall beta fructose that was either in a native configuration (this serum is called anti-beta F1) or chemically deglycosylated (anti-beta F2). The two antisera had completely different specificities when tested by immunoblotting. The anti-beta F1 serum reacted with beta fructosidase and many other carrot cell wall proteins as well as with many proteins in extracts of bean (Phaseolus vulgaris) cotyledons and tobacco (Nicotiana tabacum) seeds. It did not react with chemically deglycosylated beta-fructosidase. The anti-beta F1 serum also reacted with the bean vacuolar protein, phytohemagglutinin, but not with deglycosylated phytohemagglutinin. The anti-beta F2 antibodies recognize the beta-fructosidase polypeptide, while the beta F1 antibodies recognize glycan sidechains common to many glycoproteins. We used immunoadsorption on glycoprotein-Sepharose columns and hapten inhibition of immunoblot reactions to characterize the nature of the antigenic site. Antibody binding activity was found to be associated with Man3(Xyl)(GlcNAc)2Fuc, Man3(Xyl)(GlcNAc)2, and Man(Xyl)(GlcNAc)2 glycans, but not with Man3(GlcNAc)2. Treatment of phytohemagglutinin, a glycoprotein with a Man3(Xyl)(GlcNAc)2Fuc glycan, with Caronia lampas beta-xylosidase (after treatment with jack-bean alpha-mannosidase) greatly diminished the binding between the antibodies and phytohemagglutinin. We conclude, therefore, that the antibodies bind primarily to the xylose beta, 1 leads to 2mannose structure commonly found in the complex glycans of plant glycoproteins. Plant physiology. July 1989. v. 90 (3). p. 1182-1188. ill. Includes references. (NAL Call No.: DNAL 450 P692).

0345

Characterization of phloem iron and its possible role in the regulation of fe-efficiency reactions.
PLPHA. Maas, F.M. Wetering, D.A.M. van de; Beusichem, M.L. van; Bienfait, H.F. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. May 1988. v. 87 (1). p. 167-171. Includes references. (NAL Call No.: DNAL 450 P692).

0346

Characterization of rhizobia from ineffective alfalfa nodules: ability to nodulate bean plants Phaseolus vulgaris (L.) Savi. .
APMBA. Eardly, B.D. Hannaway, D.B.; Bottomley, P.J. Washington, D.C. : American Society for Microbiology. Applied and environmental microbiology. Dec 1985. v. 50 (6). p. 1422-1427. Includes 40 references. (NAL Call No.: DNAL 448.3 AP5).

0347

Characterization of root agravitropism induced by genetic, chemical, and developmental constraints.
AJBOA. Moore, R. Fondren, W.M.; Marcum, H. Baltimore, Md. : Botanical Society of America. American journal of botany. Mar 1987. v. 74 (3). p. 329-336. ill. Includes references. (NAL Call No.: DNAL 450 AM36).

0348

Characterization of root hair cell walls as potential barriers to the infection of plants by rhizobia. The carbohydrate component.
PLPHA. Mort, A.J. Grover, P.B. Jr. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Feb 1988. v. 86 (2). p. 638-641. Includes references. (NAL Call No.: DNAL 450 P692).

0349

Characterization of the acidic lectins from winged bean seed (Psophocarpus tetragonobus (L.) DC).
ABBIA. Kortt, A.A. New York, N.Y. : Academic Press. Archives of biochemistry and biophysics. Feb 1, 1985. v. 236 (2). p. 544-554. ill. Includes 36 references. (NAL Call No.: DNAL 381 AR2).

0350

Chemical modification of environmentally sensitive plants with GA biosynthesis inhibitors in response to SO2 stress.
PPGGD. Lee, E.H. Byun, J.K.; Wilding, S.J. Lake Alfred : The Society. Proceedings annual meeting - Plant Growth Regulator Society of America. 1985. (12th). p. 152-158. Includes references. (NAL Call No.: DNAL SB128.P5).

0351

Chickpea evaluation for cold tolerance under field conditions.
CRPSAY. Singh, K.B. Malhotra, R.S.; Saxena, M.C. Madison, Wis. : Crop Science Society of America. Chickpea (Cicer arietinum L.) yields are higher when plantings are made in early winter in the Mediterranean region instead of during the traditional spring season, but winter killing is often a problem. Cold tolerant chickpea cultivars are needed to sucessfully utilize a winter sowing approach. A study was conducted at the International Center for Agricultural Research in Dry Areas (ICARDA), Tel Hadya, Syria during 1982 to 1983 with the objective of developing a field screening technique for cold tolerance in chickpea, and to identify sources of tolerance. A set of previously identified tolerant, intermediate, and susceptible lines was sown from mid-fall to early spring. All susceptible lines sown during October were killed from cold injury, showing that the crop was more susceptible at the late vegetative stage than at the seedling stage. Consequently, a field screening technique was proposed, with an October sowing date to allow the crop to grow to the late vegetative stage before the onset of severe winter. Susceptible checks are grown at frequent intervals and evaluation takes place after the death of the susceptible check. This is followed by confirmation of tolerance. A 1 to 9 visual score was used to evaluate germplasm for cold tolerance. A total of 3276 germplasm accessions and breeding lines were evaluated form 1981 to 1987. Twenty-one lines were identified as tolerant. Cold tolerance was not associated with the phenotypic traits of leaflet area. seed size, time to maturity, plant height, or growth habit. Crop science. Mar/Apr 1989. v. 29 (2). p. 282-285. Includes references. (NAL Call No.: DNAL 64.8 C883).

0352

Chilling-enhanced photooxidation. The peroxidative destruction of lipids during chilling injury to photosynthesis and ultrastructure.
PLPHA. Wise, R.R. Naylor, A.W. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Feb 1987. v. 83 (2). p. 272-277. ill. Includes references. (NAL Call No.: DNAL 450 P692).

0353

Chilling-induced ethylene production by beans and peas.
JPGRDI. Tong, C.B.S. Yang, S.F. New York, N.Y. : Springer. Journal of plant growth regulation. 1987. v. 6 (4). p. 201-208. Includes references. (NAL Call No.: DNAL QK745.J6).

0354

Chlorophyll content in gibberellic acid treated dwarf peas.
Nordahl, C.E. Columbia, Mo. : The Interdisciplinary Plant Biochemistry and Physiology Program. Current topics in plant biochemistry and physiology : Proceedings of the ... Plant Biochemistry and Physiology Symposium held at the University of Missouri, Columbia. Meeting held on April 2-4, 1986. 1986. v. 5. p. 183. Includes references. (NAL Call No.: DNAL QK861.P55).

0355

Chlorsulfuron inhibition of cell cycle progression and the recovery of G1 arrested cells by Ile and Val.
JPGRDI. Robbins, J. Rost, T.L. New York, N.Y. : Springer. Journal of plant growth regulation. 1987. v. 6 (2). p. 67-74. Includes references. (NAL Call No.: DNAL QK745.J6).

0356

Circadian control of the accumulation of mRNAs for light- and heat-inducible chloroplast proteins in pea (Pisum sativum L.).
PLPHA. Otto, B. Grimm, B.; Ottersbach, P.; Kloppstech, K. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Sept 1988. v. 88 (1). p. 21-25. ill. Includes references. (NAL Call No.: DNAL

450 P692).

0357

Coated vesicles are involved in the transport of storage proteins during seed development in Pisum sativum L.
PLPHA. Harley, S.M. Beevers, L. Rockville, Md. : American Society of Plant Physiologists. During seed development, various storage proteins and hydrolases accumulate in specialized storage vacuoles, the protein bodies, via an elaborate intracellular transport system involving the rough endoplasmic reticulum, the Golgi apparatus, and transit vesicles. Clathrin-coated vesicles, similar to those which transport lysosomal proteins to lysosomes, an organelle analogous to the vacuole, in animal cells, could be involved in this intracellular transport mechanism. Clathrin-coated vesicles have been isolated from cotyledons of developing pea (Pisum sativum L.) seeds at the time of rapid protein accumulation and analyzed for the presence of protein body constituents. A 23,000 Mr polypeptide, corresponding to pea lectin precursor, was found associated with the vesicles, as determined by immunoblotting. The lectin precursor was apparently sequestered within the vesicles, as the polypeptide was only susceptible to proteolysis if detergents were included in the digestion buffer. A number of glycosidase activities, including alpha-mannosidase, alpha-galactosidase, and beta-N-acetylhexosaminidase, were also associated with the vesicles. Thus, it appears that clathrin-coated vesicles are involved in the intracellular transport of storage proteins during seed development. Plant physiology. Oct 1989. v. 91 (2). p. 674-678. ill. Includes references. (NAL Call No.: DNAL 450 P692).

0358

The comparative cell cycle and metabolic effects of the herbicide napropamide on root tip meristems.
PCBPB. DiTomaso, J.M. Rost, T.L.; Ashton, F.M. Duluth, Minn. : Academic Press. Pesticide biochemistry and physiology. June 1988. v. 31 (2). p. 166-174. Includes references. (NAL Call No.: DNAL SB951.P49).

0359

Comparative phloem mobility of nickel in nonsenescent plants.
PLPHA. Neumann, P.M. Chamel, A. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. June 1986. v. 81 (2). p. 689-691. ill. Includes 15 references. (NAL Call No.: DNAL 450 P692).

0360

Comparative water relations of Phaseolus vulgaris L. and Phaseolus acutifolius Gray.
PLPHA. Markhart, A.H. III. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Jan 1985. v. 77 (1). p. 113-117. ill. Includes 22 references. (NAL Call No.: DNAL 450 P692).

0361

Comparisons of Phaseolus acutifolius and Phaseolus vulgaris grown in a semi-arid environment in saline soils.
Goertz, S. Kobriger, J. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. Mar 1986. v. 29. p. 103-104. (NAL Call No.: DNAL SB327.A1B5).

0362

Concentration dependence of the effect of 6-benzylaminopurine on root growth in plants of different species.
SOPPAA. Blokhin, V.G. New York, N.Y. : Consultants Bureau. Soviet plant physiology. Translated from: Fiziologiia rastenii, v. 33 (6), November/December 1986, p. 1084-1089. (450 F58). Nov/Dec 1986 (pub. 1987). v. 33 (6,pt.1). p. 828-833. ill. Includes references. (NAL Call No.: DNAL 450 F58AE).

0363

Control by ethylene of arginine decarboxylase activity in pea seedlings and its implication for hormonal regulation of plant growth.
PLPHA. Apelbaum, A. Goldlust, A.; Icekson, I. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Nov 1985. v. 79 (3). p. 635-640. Includes 30 references. (NAL Call No.: DNAL 450 P692).

0364

Control of alpha-amylase development in cotyledons during and following germination of mung bean seeds.
PLPHA. Morohashi, Y. Katoh, H.; Kaneko, Y.; Matsushima, H. Rockville, Md. : American Society of Plant Physiologists. Developmental patterns of alpha-amylase in Vigna radiata cotyledons during and following germination were quite different depending on the differences in the treatments of cotyledons during the imbibitional stage. When axis-detached cotyledons were imbibed in water with seed-coats attached, alpha-amylase activity did not increase and remained low. On the other hand, when the cotyledons were imbibed in water after seed-coat removal, the enzyme activity increased markedly. If the axis was attached to the cotyledons, alpha-amylase showed a marked development even under the former imbibition conditions. These changes in

the enzyme activity were in parallel with those in the enzyme content, and the content, in turn, was dependent upon the availability of mRNA for alpha-amylase. We propose that the regulation of the development of alpha-amylase in cotyledons may involve some factor(s) inhibitory to accumulation of alpha-amylase mRNA, which is present in dry cotyledons and can be removed from cotyledons by leakage or by the presence of the axis. Plant physiology. Sept 1989. v. 91 (1). p. 253-258. ill. Includes references. (NAL Call No.: DNAL 450 P692).

0365

The control of lateral root development in cultured pea seedlings. I. The role of seedling organs and plant growth regulators.
BOGAA. Hinchee, M.A.W. Rost, T.L. Chicago, Ill. : University of Chicago Press. Botanical gazette. June 1986. v. 147 (2). p. 137-147. ill. Includes references. (NAL Call No.: DNAL 450 B652).

0366

Conversion of xanthoxin to abscisic acid by cell-free preparations from bean leaves.
PLPHA. Sindhu, R.K. Walton, D.C. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Dec 1987. v. 85 (4). p. 916-921. Includes references. (NAL Call No.: DNAL 450 P692).

0367

Copper toxicity affects photosystem II electron transport at the secondary quinone acceptor, Q(B).
PLPHA. Mohanty, N. Vass, I.; Demeter, S. Rockville, Md. : American Society of Plant Physiologists. The nature of Cu2+ inhibition of photosystem II (PSII) photochemistry in pea (Pisum sativum L.) thylakoids was investigated monitoring Hill activity and light emission properties of photosystem II. In Cu2+-inhibited thylakoids, diphenyl carbazide addition does not relieve the loss of Hill acivity. The maximum yield of fluorescence induction restored by hydroxylamine in Tris-inactivated thylakoids is markedly reduced by Cu2+. This suggests that Cu2+ does not act on the donor side of PSII but on the reaction center of PSII or on components beyond. Thermoluminescence and delayed luminescence studies show that charge recombination between the positively charged intermediate in water oxidation cycle (S2) and negatively charged primary quinone acceptor of PSII (Q(A)-) is largely unaffected by Cu2+. The S2Q(B)- charge recombination, however, is drastically inhibited which parallels the loss of Hill activity. This indicates that Cu2+ inhibits photosystem II photochemistry primarily affecting the function of the secondary quinone electron acceptor, Q(B). We suggest that Cu2+ does not block electron flow between the primary and secondary quinone acceptor but modifies the Q(B) site in such a way that it becomes unsuitable for further photosystem II photochemistry. Plant physiology. May 1989. v. 90 (1). p. 175-179. Includes references. (NAL Call No.: DNAL 450 P692).

0368

Correlation between biological activity and partition characteristics for the cytokinin benzyladenine (BA).
PPGGD. Carlson, R.D. Shafer, W.E. Lake Alfred, Fla. : The Society. Proceedings of the Plant Growth Regulator Society of America. 1988. (15th). p. 175. (NAL Call No.: DNAL SB128.P5).

0369

Correlative effects of fruits on plant development.
Tamas, I.A. Davies, P.J.; Mazur, B.K.; Campbell, L.B. Boulder, Colo. : Westview Press, 1985. World Soybean Research Conference III : proceedings / edited by Richard Shibles. Literature review. p. 858-865. Includes references. (NAL Call No.: DNAL SB205.S7W6 1984).

0370

Cowpea seed testing at the Federal Seed Laboratory.
HJHSA. Young, R.W. Alexandria, Va. : American Society for Horticultural Science. HortScience. Includes abstract. Oct 1989. v. 24 (5). p. 756. (NAL Call No.: DNAL SB1.H6).

0371

Critical deficiency and toxicity levels of tissue zinc in relation to cowpea growth and N2 fixation.
JOSHB. Marsh, D.B. Waters, L. Jr. Alexandria, Va. : The Society. Journal of the American Society for Horticultural Science. May 1985. v. 110 (3). p. 365-370. ill. Includes 25 references. (NAL Call No.: DNAL 81 S012).

0372

Cyanide metabolism in relation to ethylene production in plant tissues.
PLPHA. Yip, W.K. Yang, S.F. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Oct 1988. v. 88 (2). p. 473-476. Includes references. (NAL Call No.: DNAL 450 P692).

0373

Cyclic AMP, cyclic GMP, and bean rust uredospore germlings.
EXMYD. Epstein, L. Staples, R.C.; Hoch, H.C. Duluth, Minn. : Academic Press. Experimental mycology. Mar 1989. v. 13 (1). p. 100-104. ill. Includes references. (NAL Call No.: DNAL QK600.E9).

0374

Cyclohexanedione herbicides are selective and potent inhibitors of acetyl-CoA carboxylase from grasses.
PLPHA. Rendina, A.R. Felts, J.M. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Apr 1988. v. 86 (4). p. 983-986. Includes references. (NAL Call No.: DNAL 450 P692).

0375

Dehydration effects on seedling development of four range species.
JRMGA. Bassiri, M. Wilson, A.M.; Grami, B. Denver, Colo. : Society for Range Management. Journal of range management. Sept 1988. v. 41 (5). p. 383-386. Includes references. (NAL Call No.: DNAL 60.18 J82).

0376

Development of a Phaseolus crop simulation model.
Hoogenboom, G. Jones, J.W.; White, J.W.; Boote, K.J. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1987. v. 30. p. 34-35. Includes references. (NAL Call No.: DNAL SB327.A1B5).

0377

Differential regulation of phenylalanine ammonia-lyase genes during plant development and by environmental cues.
JBCHA3. Liang, X. Dron, M.; Cramer, C.L.; Dixon, R.A.; Lamb, C.J. Baltimore, Md. : American Society for Biochemistry and Molecular Biology. The Journal of biological chemistry. Aug 25, 1989. v. 269 (24). p. 14486-14492. Includes references. (NAL Call No.: DNAL 381 J824).

0378

Dirunal water balance of the cowpea fruit.
PLPHA. Pate, J.S. Peoples, M.B.; Bel, A.J.E. van; Kuo, J.; Atkins, C.A. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Jan 1985. v. 77 (1). p. 148-156. ill. Includes 17 references. (NAL Call No.: DNAL 450 P692).

0379

Drought resistance in bean (Phaseolus vulgaris L.).
Guimaraes, C.M. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. Mar 1986. v. 29. p. 130-131. (NAL Call No.: DNAL SB327.A1B5).

0380

Dynamics of imbibition in Phaseolus vulgaris L. in relation to initial seed moisture content.
PLPHA. Wolk, W.D. Dillon, P.F.; Copeland, L.F.; Dilley, D.R. Rockville, Md. : American Society of Plant Physiologists. The seed moisture level marking the onset of imbibitional injury (breakpoint) was determined for two cultivars of Phaseolus vulgaris L. cv 'Tendercrop' (TC) and 'Kinghorn Wax' (KW). At 20 degrees C the breakpoints were 0.15 gram H20/gram dry weight (gram per gram) for TC and 0.11 gram per gram for KW. When seeds were imbibed at 5 degrees C, the breakpoints were 0.19 gram per gram (TC) and 0.16 gram per gram (KW). Below the breakpoint germination changed 4.6%/0.01 gram per gram for all treatments. Imbibition rates were maximal at 0.07 gram for all treatments. Imbibition rates were maximal at 0.07 gram per gram and 0.33 gram per gram after 20 minutes imbibition. Rates of electrolyte leakage were correlated with the imbibition rate maximum at 0.07 gram per gram but were unaffected by the maximum at 0.33 gram per gram. The transition from tightly bound to semibound water occurred at 0.09 gram per gram and 0.11 gram per gram for KW and TC, respectively. T1 values increased exponentially as seed moisture decreased from 0.47 gram per gram to 0.05 gram per gram. 13C-NMR sugar signals increased at moisture levels above 0.14 gram per gram and plateaued at approximately 0.33 gram per gram seed moisture. These results suggest that the breakpoint moisture level for imbibitional damage is a function of temperature while the injury process is similar at both 5 and 20 degrees C. Imbibition and leakage rate maxima reflect transitions in the states of seed water. NMR data support the application of the Water Replacement Hypothesis to seeds. Thus, imbibitional injury may be related to specific, temperature dependent moisture levels that are determined by water binding characteristics in the seed tissue. Plant physiology. Mar 1989. v. 89 (3). p. 805-810. Includes references. (NAL Call No.: DNAL 450 P692).

0381

Edible legume seed yield and water use.
OASPA. Pumphrey, F.V. Toll, T.R.; Klepper, B.L. Corvallis, Or. : The Station. Special report - Oregon State University, Agricultural Experiment Station. June 1985. (738). p. 44-49. (NAL Call No.: DNAL 100 OR3M).

0382

Effect of a hydrophilic polymer seed coating on the field performance of sweet corn and cowpea.
JOSHB. Baxter, L. Waters, L. Jr. Alexandria, Va. : The Society. Journal of the American Society for Horticultural Science. Jan 1986. v. 111 (1). p. 31-34. Includes 17 references. (NAL Call No.: DNAL 81 S012).

0383

The effect of abscisic acid and other inhibitors on photosynthetic capacity and the biochemistry of CO2 assimilation.
PLPHA. Seemann, J.R. Sharkey, T.D. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. July 1987. v. 84 (3). p. 696-700. Includes references. (NAL Call No.: DNAL 450 P692).

0384

Effect of chromium VI on mineral element composition of bush beans.
JPNUDS. Barcelo, J. Poschenrieder, C.; Gunse, B. New York, N.Y. : Marcel Dekker. Journal of plant nutrition. 1985. v. 8 (3). p. 211-217. Includes 10 references. (NAL Call No.: DNAL QK867.J67).

0385

The effect of different dry bean growth habits on yield stability.
Kelly, J.D. Varner, G.V.; Adams, M.W. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. Mar 1986. v. 29. p. 58-59. Includes references. (NAL Call No.: DNAL SB327.A1B5).

0386

Effect of diuron on the process of photophosphorylation in chloroplasts and protein biosynthesis in seeds of pea.
SOPPAA. Tatarintsev, N.P. Lebedeva, A.I.; Makarov, A.D. New York, N.Y. : Consultants Bureau. Soviet plant physiology. Translated from: Fiziologiia rastenii, v. 33 (3), May-June 1986, p. 484-489. (450 F58). May/June 1986. v. 33 (3,pt.1). p. 372-376. Includes references. (NAL Call No.: DNAL 450 F58AE).

0387

The effect of DPX-F6025 on plant growth, pigment synthesis, and biomass synthesis.
PNWSB. Devlin, R.M. Koszanski, Z.K. Beltsville, Md. : The Society. Proceedings of the ... annual meeting - Northeastern Weed Science Society. 1986. v. 40. p. 115-119. Includes references. (NAL Call No.: DNAL 79.9 N814).

0388

The effect of ethylene on adventitious root formation in mung bean (Vigna radiata) cuttings.
JPGRDI. Robbins, J.A. Reid, M.S.; Paul, J.L.; Rost, T.L. New York, N.Y. : Springer. Journal of plant growth regulation. 1985. v. 4 (3). p. 147-157. ill. Includes references. (NAL Call No.: DNAL QK745.J6).

0389

Effect of foliar fertilization by ammonium sulphate, sodium nitrate, and ammonium nitrate on the morphology and metabolism of lentil (Lens esculentus).
PYTLA. Kord, M.A. Corvallis, Or. : Harold N. and Alma L. Moldenke. Phytologia. June 1987. v. 63 (2). p. 91-101. Includes references. (NAL Call No.: DNAL 450 P563).

0390

Effect of Harvade on abscission and cellulase activity in Phaseolus vulgaris.
PPGGD. Reid, P.D. Lake Alfred : The Society. Proceedings annual meeting - Plant Growth Regulator Society of America. 1985. (12th). p. 85-90. Includes references. (NAL Call No.: DNAL SB128.P5).

0391

Effect of high temperature on pod set of Phaseolus vulgaris L.
Monterroso, V.A. Wien, H.C. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1988. v. 31. p. 160. (NAL Call No.: DNAL SB327.A1B5).

0392

Effect of irrigation level on yield of pinto dry beans and tenderness after cooking.
HJHSA. Bordovsky, D.G. Alexandria, Va. : American Society for Horticultural Science. HortScience. Aug 1987. v. 22 (4). p. 585-586. Includes references. (NAL Call No.: DNAL SB1.H6).

0393

Effect of leaf detachment on chlorophyll fluorescence during chilling experiments.
PLPHA. Potvin, C. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Aug 1985. v. 78 (4). p. 883-886. Includes 11 references. (NAL Call No.: DNAL 450 P692).

0394

Effect of Meloidogyne incognita on plant nutrient concentration and its influence on the physiology of beans.
JONEB. Melakeberhan, H. Webster, J.M.; Brooke, R.C.; D'Auria, J.M.; Cackette, M. Raleigh, N.C. : Society of Nematologists. Journal of nematology. July 1987. v. 19 (3). p. 324-330. Includes references. (NAL Call No.: DNAL QL391.N4J62).

0395

Effect of nitrate on the organic acid and amino acid composition of legume nodules.
PLPHA. Streeter, J.G. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Nov 1987. v. 85 (3). p. 774-779. Includes references. (NAL Call No.: DNAL 450 P692).

0396

Effect of oil well brine on germination and seedling growth of several crops.
OJSCA. Munn, D.A. Stewart, R. Columbus, Ohio : Ohio Academy of Science. Ohio journal of science. Sept 1989. v. 89 (4). p. 92-94. Includes references. (NAL Call No.: DNAL 410 OH3).

0397

The effect of paclobutrazol and flurprimidol on pigment and biomass synthesis.
PPGGD. Devlin, R.M. Koszanski, Z.K. Lake Alfred : The Society. Proceedings annual meeting - Plant Growth Regulator Society of America. 1985. (12th). p. 243-247. Includes references. (NAL Call No.: DNAL SB128.P5).

0398

Effect of paclobutrazol and salt on growth and lipid constituents of moth bean seedlings.
PPGGD. Trivedi, S. Sankhla, D.; Sankhla, N.; Upadhyaya, A.; Weber, D.J.; Smith, B.N. Lake Alfred, Fla. : The Society. Proceedings of the Plant Growth Regulator Society of America. 1988. (15th). p. 39-46. Includes references. (NAL Call No.: DNAL SB128.P5).

0399

Effect of plant spacing on growth and yield of winged bean.
JAUPA. Lee, C.T. Mayaguez : University of Puerto Rico, Agricultural Experiment Station. The Journal of agriculture of the University of Puerto Rico. Apr 1988. v. 72 (2). p. 273-276. (NAL Call No.: DNAL 8 P832J).

0400

Effect of pod removal on the morphology and biomass allocation in a snap ban (Phaseolus vulgaris L.).
Santos-Vigil, C. Kohashi-Shibata, J.; Baca-Castillo, G. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. Mar 1985. v. 28. p. 87. (NAL Call No.: DNAL SB327.A1B5).

0401

Effect of potassium on sugar uptake and assimilation by bean rust germlings.
MYCOAE. Staples, R.C. Hassouna, S.; Hoch, H.C. Bronx, N.Y. : The New York Botanical Garden. Mycologia. Mar/Apr 1985. v. 77 (2). p. 248-252. Includes references. (NAL Call No.: DNAL 450 M99).

0402

Effect of PPG-1721 on several plant growth systems.
PPGGD. Devlin, R.M. Koszanski, Z.K. Lake Alfred, Fla. : The Society. Proceedings annual meeting - Plant Growth Regulator Society of America. 1987. (14th). p. 125-129. Includes references. (NAL Call No.: DNAL SB128.P5).

0403

The effect of Pseudomonas putida colonization on root surface peroxidase.
PLPHA. Albert, F. Anderson, A.J. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Oct 1987. v. 85 (2). p. 537-541. ill. Includes references. (NAL Call No.: DNAL 450 P692).

0404

Effect of seed size and temperature on germination index of chickpea (Cicer arietinum L.).
AAREEZ. Smith, C.W. Wiesner, L.E.; Lockerman, R.H.; Frisbee, C. New York : Springer. Applied agricultural research. 1987. v. 2 (5). p. 342-344. Includes references. (NAL Call No.: DNAL S539.5.A77).

0405

Effect of soil environmental factors on rhizobia.
Roughley, R.J. Boulder, Colo. : Westview Press, 1985. World Soybean Research Conference III : proceedings / edited by Richard Shibles. Literature review. p. 903-910. Includes references. (NAL Call No.: DNAL SB205.S7W6 1984).

0406

Effect of surfactants on foliar penetration of NAA and NAA-induced ethylene evolution in cowpea.
JOSHB. Lownds, N.K. Leon, J.M.; Bukovac, M.J. Alexandria, Va. : The Society. Journal of the American Society for Horticultural Science. May 1987. v. 112 (3). p. 554-560. ill. Includes references. (NAL Call No.: DNAL 81 S012).

0407

Effect of temperature on root length under water-limited conditions for Phaseolus acutifolius and Phaseolus vulgaris.
Bouscaren, S.J. Lazcano F, I.; Waines, J.G. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1987. v. 30. p. 83-84. Includes references. (NAL Call No.: DNAL SB327.A1B5).

0408

Effect of thidiazuron, a cytokinin-active urea derivative, in cytokinin-dependent ethylene production systems.
PLPHA. Yip, W.K. Yang, S.F. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Feb 1986. v. 80 (2). p. 515-519. Includes 24 references. (NAL Call No.: DNAL 450 P692).

0409

The effect of triacontanol on 14C-IAA in mung beans (Phaseolus aureus RoxB.).
PPGGD. Henry, E.W. Kanaby, J. Lake Alfred, Fla. : The Society. Proceedings of the Plant Growth Regulator Society of America. 1988. (15th). p. 147-158. ill. Includes references. (NAL Call No.: DNAL SB128.P5).

0410

Effects of arsenite, sulfite, and sulfate on photosynthetic carbon metabolism in isolated pea (Pisum sativum L., cv Little Marvel) chloroplasts.
PLPHA. Marques, I.A. Anderson, L.E. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Oct 1986. v. 82 (2). p. 488-493. Includes references. (NAL Call No.: DNAL 450 P692).

0411

Effects of brassinolide and other natural plant growth regulators on the morphology of pea stem tissue.
PPGGD. Sasse, J.M. Lake Alfred, Fla. : The Society. Proceedings annual meeting - Plant Growth Regulator Society of America. 1987. (14th). p. 30-39. ill. Includes references. (NAL Call No.: DNAL SB128.P5).

0412

The effects of calcium, iron, and EDTA on rooting and callus weight in common bean.
Watt, E.E. Hosfield, G.L.; Hoyos, R.A.; Saunders, J. Fort Collins, Colo : Howard F. Schwartz, Colorado State University. Annual report of the Bean Improvement Cooperative. 1989. v. 32. p. 34-35. Includes references. (NAL Call No.: DNAL SB327.A1B5).

0413

Effects of cooling rate on seeds exposed to liquid nitrogen temperatures.
PLPHA. Vertucci, C.W. Rockville, Md. : American Society of Plant Physiologists. The effect of cooling rate on seeds was studied by hydrating pea (Pisum sativum), soybean (Glycine max), and sunflower (Helianthus annuus) seeds to different levels and then cooling them to -190 degrees C at rates ranging from 1 degree C/minute to 700 degrees C/minute. When seeds were moist enough to have freezable water (greater than 0.25 gram H2O/gram dry weight), rapid cooling rates were optimal for maintaining seed vigor. If the seeds were cooled while at intermediate moisture levels (0.12 to 0.20 gram H2O per gram dry weight), there appeared to be no effect of cooling rate on seedling vigor. When seeds were very dry (less than 0.08 gram H2O per gram dry weight), cooling rate had no effect on pea, but rapid cooling rates had a marked detrimental effect on soybean and sunflower germination. Glass transitions, detected by differential scanning calorimetry, were observed at all moisture contents in sunflower and soybean cotyledons that were cooled rapidly. In pea, glasses were detectable when cotyledons with high moisture levels were cooled rapidly. The nature of the glasses changed with moisture content. It is suggested that, at high moisture contents, glasses were formed in the aqueous phase, as well as the lipid phase if tissues had high oil contents, and this had beneficial effects on the survival of seeds at low temperatures. At low moisture contents, glasses were observed to form in the lipid phase and this was associated with detrimental effects on seed viability. Plant physiology. Aug 1989. v. 90 (4). p. 1478-1485. Includes references. (NAL Call No.: DNAL 450 P692).

0414

Effects of elicitors on plant membrane functions.
Rogers, K. Anderson, A.J. New York : Alan R. Liss. UCLA symposia on molecular and cellular biology. In the series analytic: Plant membranes: structure, function, biogenesis / edited by C. Leaver and H. Sze. Proceedings of a Symposium, February 8-13, 1987, Park City, Utah. 1987. v. 63. p. 403-418. Includes references. (NAL Call No.: DNAL QH506.U34).

0415

Effects of environmental stress on pollen of Phaseolus vulgaris L.
Shen, X.Y. Webster, B.D. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. Mar 1986. v. 29. p. 111-112. (NAL Call No.: DNAL SB327.A1B5).

0416

Effects of growth regulators on yield and quality of mungbean sprouts grown in an automatically controlled chamber.
JFQUD. Chen, S.L. Breene, W.M.; Schowalter, C. Westport, Conn. : Food & Nutrition Press. Journal of food quality. 1987. v. 10 (4). p. 219-238. Includes references. (NAL Call No.: DNAL TP373.5.J6).

0417

Effects of inhibitors on the membrane potential (delta psi) of mung bean mitochondria.
Moreland, D.E. Novitzky, W.P. New York : Plenum Press, c1987. Plant mitochondria : structural, functional, and physiological aspects / edited by A.L. Moore and R.B. Beechey. p. 93-96. Includes references. (NAL Call No.: DNAL QK725.P63).

0418

Effects of Ni deficiency on some nitrogen metabolites in cowpeas (Vigna unguiculata L. Walp).
PLPHA. Walker, C.D. Graham, R.D.; Madison, J.T.; Cary, E.E.; Welch, R.M. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Oct 1985. v. 79 (2). p. 474-479. ill. Includes 33 references. (NAL Call No.: DNAL 450 P692).

0419

Effects of nitrogen dioxide and nitrate nutrition on nodulation, nitrogenase activity, growth, and nitrogen content of bean plants.
PLPHA. Srivastava, H.S. Ormrod, D.P. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. July 1986. v. 81 (3). p. 737-741. Includes 27 references. (NAL Call No.: DNAL 450 P692).

0420

Effects of oxygen and temperature during imbibition in seeds of two bean lines at two moisture levels.
JOSHB. Ladror, U. Dyck, R.L.; Silbernagel, M.J. Alexandria, Va. : The Society. Journal of the American Society for Horticultural Science. July 1986. v. 111 (4). p. 572-577. ill. Includes references. (NAL Call No.: DNAL 81 SO12).

0421

Effects of paclobutrazol on GA biosynthesis and fatty acid composition--a case study on the differential sensitivity to SO2 stress in snap bean (Phaseolus vulgaris L.) plants.
PPGGD. Lee, E.H. Saftner, R.A.; Wilding, S.J.; Clark, H.D.; Rowland, R.A. Lake Alfred, Fla. : The Society. Proceedings annual meeting - Plant Growth Regulator Society of America. 1987. (14th). p. 295-302. Includes references. (NAL Call No.: DNAL SB128.P5).

0422

The effects of root cooling and excision treatments on the growth of primary leaves of Phaseolus vulgaris L. Rapid and reversible increases in abscisic acid content.
NEPHA. Smith, P.G. Dale, J.E. New York, N.Y. : Cambridge University Press. The New phytologist. Nov 1988. v. 110 (3). p. 293-300. Includes references. (NAL Call No.: DNAL 450 N42).

0423

The effects of root treatments on growth of the primary leaves of Phaseolus vulgaris L.: biophysical analysis.
NEPHA. Milligan, S.P. Dale, J.E. New York, N.Y. : Cambridge University Press. The New phytologist. May 1988. v. 109 (1). p. 35-40. Includes references. (NAL Call No.: DNAL 450 N42).

0424

Effects of salinity and relative humidity on growth and ionic relations of plants.
NEPHA. Salim, M. New York, N.Y. : Cambridge University Press. The New phytologist. Sept 1989. v. 113 (1). p. 13-20. Includes references. (NAL Call No.: DNAL 450 N42).

0425

Effects of single and multiple exposures of ferulic acid on the vegetative and reproductive growth of Phaseolus vulgaris BBL-290.
AJBOA. Waters, E.R. Blum, U. Baltimore, Md. : Botanical Society of America. American journal of botany. Nov 1987. v. 74 (11). p. 1635-1645. Includes references. (NAL Call No.: DNAL 450 AM36).

0426

Effects of sulfur dioxide on nitrogen fixation, carbon partitioning, and yield components in snapbean.
JEVQAA. Griffith, S.M. Campbell, W.F. Madison, Wis. : American Society of Agronomy. Journal of environmental quality. Jan/Mar 1987. v. 16 (1). p. 77-80. Includes references. (NAL Call No.: DNAL QH540.J6).

0427

Effects of tillage methods and soil cover crops on yield and leaf elemental concentrations of snap bean.
AAREEZ. Grenoble, D.W. Bergman, E.L.; Orzolek, M.D. New York, N.Y. : Springer. Field studies were conducted in 1981-1983 with snapbeans (Phaseolus vulgaris L.) comparing tillage methods, cover crops and their effects on yield and concentration of nutrients in the plants. No-tillage (NT), strip-tillage (ST), and conventional tillage (CT) were compared in combination with two cover crops, red clover (Trifolium pratense) and rye (Secale cereale), and no soil cover. Yields were greatest with CT methods two out of three years. There was a trend towards higher snap bean yields following either of the cover crops compared to no soil cover; however, only in 1981 did presence of soil cover have a significant effect on yield. Leaf P was lower in crops with CT than with reduced tillage during each year. Leaf Al decreased as tillage decreased. Boron levels were always greater with reduced tillage as compared to CT. Boron concentrations in tissue were lower following rye as compared to red clover or no clover in two of the years. Applied agricultural research. Spring 1989. v. 4 (2). p. 81-85. Includes references. (NAL Call No.: DNAL S539.5.A77).

0428

Effects of water stress on pollen of Phaseolus vulgaris L.
JOSHB. Shen, X.Y. Webster, B.D. Alexandria, Va. : The Society. Journal of the American Society for Horticultural Science. Sept 1986. v. 111 (5). p. 807-810. ill. Includes references. (NAL Call No.: DNAL 81 SO12).

0429

Endogenous root initiating substances in rhizomes of Cyperus rotundus.
PPGGD. Bhattacharya, N.C. Bhattacharya, S.; Bhatnagar, V.B.; Ahmed, F.U. Lake Alfred, Fla. : The Society. Proceedings annual meeting - Plant Growth Regulator Society of America. 1987. (14th). p. 256-267. Includes references. (NAL Call No.: DNAL SB128.P5).

0430

Environmental effects on photosynthesis, nitrogen-use efficiency, and metabolite pools in leaves of sun and shade plants.
PLPHA. Seemann, J.R. Sharkey, T.D.; Wang, J.L.; Osmond, C.B. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. July 1987. v. 84 (3). p. 796-802. Includes references. (NAL Call No.: DNAL 450 P692).

0431

Epidermis integrity and epicotyl growth in azuki bean.
JPGRDI. Branca, C. Ricci, D.; Bassi, M. New York, N.Y. : Springer. Journal of plant growth regulation. 1988. v. 7 (2). p. 95-109. ill. Includes references. (NAL Call No.: DNAL QK745.J6).

0432

Equilibrium moisture properties of winged bean seed.
TAAEA. Ajibola, O.O. St. Joseph, Mich. : The Society. Transactions of the ASAE - American Society of Agricultural Engineers. Sept/Oct 1986. v. 29 (5). p. 1485-1487. Includes references. (NAL Call No.: DNAL 290.9 AM32T).

0433

Ethylene and auxin-ethylene interaction in adventitious root formation in mung bean (Vigna radiata) cuttings.
JPGRDI. Riov, J. Yang, S.F. New York, N.Y. : Springer. Journal of plant growth regulation. Spring 1989. v. 8 (2). p. 131-141. Includes references. (NAL Call No.: DNAL QK745.J6).

0434

Ethylene-like activity of isocyanides.
PLPHA. Quinn, J.M. Yang, S.F. Rockville, Md. : American Society of Plant Physiologists. Benzyl isocyanide, cyclohexyl isocyanide, benzyl isocyanate, methyl isocyanate, benzyl isothiocyanate, and methyl isothiocyanate were each tested for ethylene-like activity in a pea (Pisum sativum) growth assay. Only the isocyanides gave an ethylene-like response; the concentration that gave a half-maximal response was approximately 10 to 15 microliters per liter for each isocyanide, and this activity was inhibited by norbornadiene, a competitive inhibitor of ethylene action. Since the isocyanides did not promote endogenous ethylene production, it was concluded that the isocyanides acted directly to give an ethylene-like response. The isocyanides were further shown to elicit ethylene-like activity in a potato (Solanum tuberosum) tuber respiration assay, in a carnation (Dainthus caryophyllus) senescence assay and in a carrot (Daucus carota L.) isocoumarin formation assay.

The feasibility of employing azido derivatives of benzyl isocyanide to photoaffinity label ethylene receptors in vivo is discussed. Plant physiology. Oct 1989. v. 91 (2). p. 669-673. ill. Includes references. (NAL Call No.: DNAL 450 P692).

0435

Factors affecting ice nucleation in plant tissues.
PLPHA. Ashworth, E.N. Davis, G.A.; Anderson, J.A. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Dec 1985. v. 79 (4). p. 1033-1037. Includes 19 references. (NAL Call No.: DNAL 450 P692).

0436

Fertilizer placement effects on growth responses and nutrient uptake of sweet corn, snapbeans, tomatoes and cabbage.
CSOSA2. Smith, C.B. Demchak, K.T.; Ferretti, P.A. New York, N.Y. : Marcel Dekker. Communications in soil science and plant analysis. 1990. v. 21 (1/2). p. 107-123. Includes references. (NAL Call No.: DNAL S590.C63).

0437

Fiber-optic spectrophotometry of cowpea nodules treated with nitrate or ammonium.
CSOSA2. Franco-Vizcaino, E. Deal, W.J.; Jarrell, W.M. New York, N.Y. : Marcel Dekker. Communications in soil science and plant analysis. May 1988. v. 19 (6). p. 691-706. ill. Includes references. (NAL Call No.: DNAL S590.C63).

0438

Flower and fruit development in tepary bean.
HJHSA. Weis, K.G. Webster, B.D. Alexandria, Va. : American Society for Horticultural Science. HortScience. Jan 1990. v. 25 (1). p. 119-120. ill. Includes references. (NAL Call No.: DNAL SB1.H6).

0439

Flower and pod set of Phaseolus vulgaris under controlled environment conditions.
HJHSA. Pechan, P.M. Webster, B.D. Alexandria, Va. : American Society for Horticultural Science. HortScience. Aug 1986. v. 21 (4). p. 989-991. ill. Includes references. (NAL Call No.: DNAL SB1.H6).

0440

Flowering and fruiting patterns of Phaseolus vulgaris L.
BOGAA. Sage, T.L. Webster, B.D. Chicago, Ill. : University of Chicago Press. Botanical gazette. Mar 1987. v. 148 (1). p. 35-41. ill. Includes references. (NAL Call No.: DNAL 450 B652).

0441

Flurprimidol: plant response, translocation, and metabolism.
JOSHB. Sterrett, J.P. Tworkoski, T.J. Alexandria, Va. : The Society. Journal of the American Society for Horticultural Science. Mar 1987. v. 112 (3). p. 341-345. Includes references. (NAL Call No.: DNAL 81 S012).

0442

Forage phytomass potential of fababean (Vicia faba L.) under irrigation.
AAREEZ. Lockerman, R.H. Buss, D.A.; Wiesner, L.E.; Westesen, G.L. New York, N.Y. : Springer. A line-source sprinkler irrigation system was used to superimpose a decreasing soil moisture gradient on fababean (Vicia faba L.) at Bozeman and Manhattan, Montana, USA in 1982 and 1984, respectively. Plant height, seed yield, and straw phytomass were evaluated at evapotranspiration (ET) levels ranging from 354 to 540 mm (13.9 to 21.3 in.) in 1982 and 320 to 500 mm in 1984. Moisture had the greatest effect on plant height during the intermediate growth and development stages during both years. Total above-ground phytomass production, as a function of ET levels, ranged from approximately 5 to 11 Mg/ha (4461 to 9814 lb/A) in 1982 and 5 to 10 Mg/ha in 1984. Applied agricultural research. Fall 1989. v. 4 (4). p. 235-239. Includes references. (NAL Call No.: DNAL S539.5.A77).

0443

Free space iron pools in roots. Generation and mobilization.
PLPHA. Bienfait, H.F. Briel, W.V.D.; Mesland-Mul, N.T. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. July 1985. v. 78 (3). o. 596-600. Includes 32 references. (NAL Call No.: DNAL 450 P692).

0444

Fructose 2,6-bisphosphate inhibition of phosphoglucomutase.
PLPHA. Galloway, C.M. Dugger, W.M.; Black, C.C. Jr. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Dec 1988. v. 88 (4). p. 980-982. Includes references. (NAL Call No.: DNAL 450 P692).

0445

Functional implications of the subcellular localization of ethylene-induced chitinase and beta-1,3-glucanase in bean leaves.
Mauch, F. Staehelin, L.A. Rockville, Md. : American Society of Plant Physiologists. The Plant cell. Apr 1989. v. 1 (4). p. 447-457. ill. Includes references. (NAL Call No.: DNAL QK725.P532).

0446

Further characterization of ribosome binding to thylakoid membranes.
PLPHA. Hurewitz, J. Jagendorf, A.T. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. May 1987. v. 84 (1). p. 31-34. Includes references. (NAL Call No.: DNAL 450 P692).

0447

Galactose inhibition of auxin-induced growth of mono- and dicotyledonous plants.
PLPHA. Yamamoto, R. Inouhe, M.; Masuda, Y. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Apr 1988. v. 86 (4). p. 1223-1227. Includes references. (NAL Call No.: DNAL 450 P692).

0448

Gas exchange, carbon isotope discrimination, and chloroplast ultrastructure of a chlorophyll-deficient mutant of cowpea.
CRPSAY. Kirchhoff, W.R. Hall, A.E.; Thomson, W.W. Madison, Wis. : Crop Science Society of America. Chlorophyll-deficient mutants provide an opportunity for studying relationships among chlorophyll composition, chloroplast ultrastructure, and plant function. A chlorophyll-deficient mutant of cowpea Vigna unguiculata (L.) Walp. and its normally pigmented parent were grown in glasshouse and field conditions. The chlorophyll (a + b) content of the mutant was 35 to 48% less per unit leaf area and the chlorophyll a:b ratio was 62 to 74% greater than the parents. Chloroplasts of the mutant had distended thylakoids and substantially reduced granal stacking, supporting the hypothesis that chlorophyll content, chlorophyll a:b ratio, and chloroplast lamellar organization are developmentally related. The mutant had significantly higher CO_2 assimilation rates per unit leaf area (+13%) at high photon flux densities and a quantum requirement that was not significantly different from the parent. Apparently, the mutant's ability to assimilate CO_2 was not adversely affected by the substantial changes in chlorophyll content and composition, and chloroplast ultrastructure, compared with the parent. Significant differences in 13C discrimination for leaves sampled from field-grown plants led to the prediction that plants in a drier treatment had higher intrinsic water-use efficiency than well-watered plants, which was consistent with significant differences observed in leaf gas exchange by the same plants. The mutant had significantly greater 13C discrimination than the parent; however, leaf gas exchange data indicated no significant differences in intrinsic water-use efficiency. Crop science. Jan/Feb 1989. v. 29 (1). p. 109-115. ill. Includes references. (NAL Call No.: DNAL 64.8 C883).

0449

Germination and emergence response of common and tepary beans to controlled temperature.
AGJOAT. Scully, B. Waines, J.G. Madison, Wis. American Society of Agronomy. Agronomy journal Mar/Apr 1987. v. 79 (2). p. 287-291. Includes references. (NAL Call No.: DNAL 4 AM34P).

0450

Germination, growth and starch breakdown in Cl3Fe pretreated pea and barley seeds.
JPNUDS. Dieguez, M.J. Aguera, E.; Agui, I. New York, N.Y. : Marcel Dekker. Journal of plant nutrition. 1985. v. 8 (3). p. 233-248. Includes 19 references. (NAL Call No.: DNAL QK867.J67).

0451

Germination response of tepary and navy beans to sodium chloride temperature.
HJHSA. Goertz, S.H. Coons, J.M. Alexandria, Va. : American Society for Horticultural Science. HortScience. Dec 1989. v. 24 (6). p. 923-925. Includes references. (NAL Call No.: DNAL SB1.H6).

0452

Gibberellic acid effects on greening in pea seedlings.
PLPHA. Mathis, J.N. Bradburne, J.A.; Dupree, M.A. Rockville, Md. : American Society of Plant Physiologists. The effect of gibberellic acid (GA) on light-induced greening of etiolated pea plants (Pisum sativum L. cultivars Alaska and Progress) was characterized. Progress, a GA-deficient dwarf of Alaska, was found to accumulate chlorophyll and light harvesting chlorophyll protein associated with photosystem II (LHC-II) more rapidly than Alaska, Alaska treated with GA, or Progress treated with GA. A slightly lower chlorophyll content was noted after 24 hours of light induced greening for Alaska treated with GA relative to untreated Alaska. GA-treated Progress, Alaska, and GA-treated Alaska all gave essentially identical patterns for LHC-II accumulation. Similar patterns of LHC-II mRNA induction were found in all four treatments indicating that differences in mRNA induction did not cause differences in LHC-II accumulation. Chlorophyll and LHC-II accumulation in each treatment followed the same patterns of accumulation and

a significant correlation (at the 0.01 level of significance) was found between chlorophyll and LHC-II content. Since Progress treated with GA accumulated LHC-II and chlorophyll in a manner similar to that of Alaska, it is clear that GA alters the process of greening either directly or indirectly. Plant physiology. Sept 1989. v. 91 (1). p. 19-22. ill. Includes references. (NAL Call No.: DNAL 450 P692).

0453

Gibberellin-induced changes in the populations of translatable mRNAs and accumulated polypeptides in dwarfs of maize and pea.
PLPHA. Chory, J. Voytas, D.F.; Olszewski, N.E.; Ausubel, F.M. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Jan 1987. v. 83 (1). p. 15-23. ill. Includes references. (NAL Call No.: DNAL 450 P692).

0454

Growth and maintenance respiration in leaves of bean (Phaseolus vulgaris L.) exposed to ozone in open-top chambers in the field.
NEPHA. Amthor, J.S. New York, N.Y. : Cambridge University Press. The New phytologist. Nov 1988. v. 110 (3). p. 319-325. Includes references. (NAL Call No.: DNAL 450 N42).

0455

Growth inhibition, turgor maintenance, and changes in yield threshold after cessation of solute import in pea epicotyls.
PLPHA. Schmalstig, J.G. Cosgrove, D.J. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Dec 1988. v. 88 (4). p. 1240-1245. Includes references. (NAL Call No.: DNAL 450 P692).

0456

Growth regulators have rapid effects on photosynthate unloading from seed coats of Phaseolus vulgaris L.
PLPHA. Clifford, P.E. Offler, C.E.; Patrick, J.W. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Mar 1986. v. 80 (3). p. 635-637. Includes 28 references. (NAL Call No.: DNAL 450 P692).

0457

Growth retardant-induced changes in phototropic reaction of Vigna radiata seedlings.
PLPHA. Konjevic, R. Grubisic, D.; Neskovic, M. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Apr 1989. v. 89 (4). p. 1085-1087. Includes references. (NAL Call No.: DNAL 450 P692).

0458

Heat shock enhances the synthesis of a lectin-related protein in Dolichos biflorus cell suspension cultures.
PLPHA. Spadoro-Tank, J. Etzler, M.E. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Dec 1988. v. 88 (4). p. 1131-1135. ill. Includes references. (NAL Call No.: DNAL 450 P692).

0459

Heat shock-induced development of infection structures by bean rust uredospore germlings.
EXMYD. Staples, R.C. Hoch, H.C.; Freve, P.; Bourett, T.M. Duluth, Minn. : Academic Press. Experimental mycology. June 1989. v. 13 (2). p. 149-157. ill. Includes references. (NAL Call No.: DNAL QK600.E9).

0460

Heat shock response of the chloroplast genome in Vigna sinensis.
JBCHA3. Krishnasamy, S. Manner Mannan, R.; Krishnan, M.; Gnanam, A. Baltimore, Md. : American Society for Biochemistry and Molecular Biology. The Journal of biological chemistry. Apr 15, 1988. v. 263 (11). p. 5104-5109. ill. Includes references. (NAL Call No.: DNAL 381 J824).

0461

Heat stress enhances phytohemagglutinin synthesis but inhibits its transport out of the endoplasmic reticulum.
PLPHA. Chrispeels, M.J. Greenwood, J.S. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Apr 1987. v. 83 (4). p. 778-784. ill. Includes references. (NAL Call No.: DNAL 450 P692).

0462

Host legume control of Rhizobium function.
Phillips, D.a. Bedmar, E.J.; Qualset, C.O.; Teuber, L.R. New York : Elsevier, c1985. Nitrogen fixation and CO2 metabolism : proceedings, Fourteenth Steenbock Symposium, 17-22 June 1984 at the University of Wisconsin--Madison, Madison, Wisconsin, U.S.A / editors, Paul W. Ludden and Jo. Literature review. p. 203-212. Includes 40 references. (NAL Call No.: DNAL QH345.H37 1984).

0463

Host-pathogen interactions, XXXIII. A plant protein converts a fungal pathogenesis factor into an elicitor of plant defense responses.
PLPHA. Cervone, F. Hahn, M.G.; De Lorenzo, G.; Darvill, A.; Albersheim, P. Rockville, Md. : American Society of Plant Physiologists. This paper describes the effect of a plant-derived polygalacturonase-inhibiting protein (PGIP) on the activity of endopolygalacturonases isolated from fungi. PGIP's effect on endopolygalacturonases is to enhance the production of oligogalacturonides that are active as elicitors of phytoalexin (antibiotic) accumulation and other defense reactions in plants. Only oligogalacturonides with a degree of polymerization higher than nine are able to elicit phytoalexin synthesis in soybean cotyledons. In the absence of PGIP, a 1-minute exposure of polygalacturonic acid to endopolygalacturonase resulted in the production of elicitor-active oligogalacturonides. However, the enzyme depolymerized essentially all of the polygalacturonic acid substrate to elicitor-inactive oligogalacturonides within 15 minutes. When the digestion of polygalacturonic acid was carried out with the same amount of enzyme but in the presence of excess PGIP, the rate of production of elicitor-active oligogalacturonides was dramatically altered. The amount of elicitor-active oligogalacturonide steadily increased for 24 hours. It was only after about 48 hours that the enzyme converted the polygalacturonic acid into short, elicitor-inactive oligomers. PGIP is a specific, reversible, saturable, high-affinity receptor for endopolygalacturonase. Formation of the PGIP-endopolygalacturonase complex results in increased concentrations of oligogalacturonides that activate plant defense responses. The interactionof the plant-derived PGIP with fungal endopolygalacturonases may be a mechanism by which plants convert endopolygalacturonase, a factor important for the virulence of pathogens, into a factor that elicits plant defense mechanisms. Plant physiology. June 1989. v. 90 (2). p. 542-548. (NAL Call No.: DNAL 450 P692).

0464

Host suitability of Phaseolus lunata for Trichoplusia ni (Lepidoptera: Noctuidae) in controlled carbon dioxide atmospheres.
EVETEX. Osbrink, W.L.A. Trumble, J.T.; Wagner, R.E. College Park, Md. : Entomological Society of America. Environmental entomology. June 1987. v. 16 (3). p. 639-644. ill. Includes references. (NAL Call No.: DNAL QL461.E532).

0465

Immunoaffinity techniques applied to the purification of gibberellins from plant extracts.
PLPHA. Durley, R.C. Sharp, C.R.; Maki, S.L.; Brenner, M.L.; Carnes, M.G. Rockville, Md. : American Society of Plant Physiologists. The use of immunoaffinity columns containing anti-gibberellin (GA) antibodies for the selective purification of GAs in plant extracts is described. GA1, GA3, GA4, GA5, GA7, and GA9 conjugates to bovine serum albumin were synthesized and used to elicit anti-GA polyclonal antibodies (Abs) in rabbits. Protein A purified rabbit serum, containing a mixture of anti-GA Abs, was immobilized on matrices of Affi-gel 10 or Fast-Flow Sepharose 4B. Columns of these immunosorbents retained a wide range of C-19 GA methyl esters, but no C-20 GA methyl esters. Quantitative recovery of C-19 GA methyl esters was achieved from the columns, which, after reequilibration in buffer, could be reused up to 500 times. The immunosorbents were tested by examination of extracts from immature soybean and pea seeds. GAs were initially purified by passing the extracts through DEAE-cellulose and concentrating them on octadecylsilica. The extracts were methylated and further purified on the mixed anti-GA immunoaffinity columns. GAs were detected and quantified as methyl esters or methyl ester trimethylsilyl ethers by gas chromatography-mass spectrometry-selected ion monitoring. GA7 was found in soybean seeds, 17 days after anthesis, at low levels (8.8 nanograms per gram fresh weight). C-19 GAs were examined in cotyledons, embryonic axes, and testae of G2 pea seeds harvested 20 days after anthesis. High levels of GA20 and GA29 were found in cotyledons (3580 and 310 nanograms per gram fresh weight, respectively) and embryonic axes (5375 and 1430 nanograms per gram) fresh weight, respectively). Lower levels of GA9 were found in cotyledons and embryonic axes (147 and 161 nanograms per gram fresh weight, respectively). GA9 was the major GA of testae at levels of 195 nanograms per gram fresh weight. Trace quantities of GA20 and GA51 were also observed in testae. Plant physiology. June 1989. v. 90 (2). p. 445-451. Includes references. (NAL Call No.: DNAL 450 P692).

0466

Immunochemical relatedness of fungal NADPH-cytochrome P-450 reductases and their ability to reconstitute pisatin demethylase activity.
EXMYD. Scala, F. Matthews, D.; Costa, M.; VanEtten, H.D. Duluth, Minn. : Academic Press. Experimental mycology. Dec 1988. v. 12 (4). p. 377-385. ill. Includes references. (NAL Call No.: DNAL QK600.E9).

0467

Impairment of tonoplast H+-ATPase as an initial physiological response of cells to chilling in mung bean (Vigna radiata L. Wilczek).
PLPHA. Yoshida, S. Matsuura, C.; Etani, S. Rockville, Md. : American Society of Plant Physiologists. Biochemical alterations of cellular membranes in chilling-sensitive mung bean (Vigna radiata L. Wilczek) hypocotyls were investigated with reference to chilling injury. Reversible decreases in activities of tonoplast H+-ATPase and in vivo respiration became manifest within 24 hours of chilling when tissues suffered no permanent injury as assessed by electrolyte leakage and regrowth capacity. These changes were found to be the earliest cellular responses to chilling. A density-shift on a sucrose density gradient was observed in Golgi membranes early in the chilling treatment, suggesting that Golgi function and/or membrane biogenesis via the Golgi may have been altered upon chilling. After chilling more than 2 days, irreversible changes were generally produced in cellular membranes including the plasma membrane, endoplasmic reticulum, and mitochondria. Respiratory functions remained intact in mitochondria isolated from tissues prechilled for 24 hours, but were impaired after prechilling for 3 days. Given the important role of the tonoplast H+-ATPase in the active transport of ions and metabolites, the early decline in the tonoplast H+-ATPase activity may give rise to an alteration of the cytoplasmic environment and, consequently, trigger a series of degenerative reactions in the cells. Plant physiology. Feb 1989. v. 89 (2). p. 634-642. Includes references. (NAL Call No.: DNAL 450 P692).

0468

Increase in the number of pods and flowers in bean plants by aspirin.
PPGGD. Larque-Saavedra, A. Lang O, F. Lake Alfred, Fla. : The Society. Proceedings of the Plant Growth Regulator Society of America. 1988. (15th). p. 186-188. Includes references. (NAL Call No.: DNAL SB128.P5).

0469

Increased abscisic acid biosynthesis during plant dehydration requires transcription.
PLPHA. Guerrero, F. Mullet, J.E. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Feb 1986. v. 80 (2). p. 588-591. Includes 13 references. (NAL Call No. DNAL 450 P692).

0470

Increased levels of peroxisomal active oxygen-related enzymes in copper-tolerant pea plants.
PLPHA. Palma, J.M. Gomez, M.; Yanez, J.; Del Rio, L.A. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Oct 1987. v. 85 (2). p. 570-574. Includes references. (NAL Call No.: DNAL 450 P692).

0471

Increased 8-hydroxyguanine content of chloroplast DNA from ozone-treated plants.
PLPHA. Floyd, R.A. West, M.S.; Hogsett, W.E.; Tingey, D.T. Rockville, Md. : American Society of Plant Physiologists. The mechanism of ozone-mediated plant injury is not known but has been postulated to involve oxygen free radicals. Hydroxyl free radicals react with DNA causing formation of many products, one of which is 8-hydroxyguanine. By using high preformance liquid chromatography with electrochemical detection, the 8-hydroxy-2′-deoxyguanosine (8-OHdG) content of a DNA enzymatic digest can be sensitively quantitated. Beans (Phaseolus vulgaris L.) and peas (Pisum sativum L.) were treated with an ozone regime that caused acute injury. Chloroplast DNA was obtained from plants harvested either immediately after ozone treatment or 24 hours later. Ozone-exposed plants in general had nearly two-fold higher levels of 8-OHdG as compared to control plants. In vito treatment of DNA in buffer solution with ozone did not cause formation of 8-OHdG in DNA, even though ozone did react directly with the macromolecule per se. Exposure of isolated, illuminated chloroplasts to ozone caused nearly a seven-fold increase in the amount of 8-OHdG in the chloroplast DNA as compared to none-ozone-exposed chloroplasts. These results suggest that ozone exposure to plants causes formation of enhanced levels of oxygen free radicals, thus mediating formation of 8-OHdG in chloroplast DNA. The reaction of ozone with DNA per se did not cause formation of 8-OHdG. Therefore, it is the interaction of ozone with plant cells and isolated chloroplasts which mediates oxygen free radical formation. Plant physiology. Oct 1989. v. 91 (2). p. 644-647. Includes references. (NAL Call No.: DNAL 450 P692).

0472

Induction of fruit set and development in pea ovary explants by gibberellic acid.
JPGRDI. Garcia-Martinez, J.L. Carbonell, J. New York, N.Y. : Springer. Journal of plant growth regulation. 1985. v. 4 (1). p. 19-27. Includes references. (NAL Call No.: DNAL QK745.J6).

0473

The influence of acid factors on the growth of snapbeans major appalachian soils.
CSOSA2. Wright, J.R. Baligar, V.C.; Wright, S.F. New York, N.Y. : Marcel Dekker. Communications in soil science and plant analysis. Nov 1987. v. 18 (11). p. 1235-1252. Includes references. (NAL Call No.: DNAL S590.C63).

0474

The influence of aluminum on photosynthesis and translocation in French bean.
JPNUDS. Hoddinott, J. Richter, C. New York, N.Y. : Marcel Dekker. Journal of plant nutrition. Mar 1987. v. 10 (4). p. 443-454. Includes references. (NAL Call No.: DNAL QK867.J67).

0475

The influence of aluminum on the uptake and release of sucrose by bean leaf tissue.
Hoddinott, J. New York : Alan R. Liss. Plant biology. In the series analytic: Phloem Transport / edited by J. Cronshaw, W.J. Lucas and R.T. Giaquinta. Proceedings of an International Conference, August 18-23, 1985, Asilomar, California. 1986. v. 1. p. 23-26. Includes references. (NAL Call No.: DNAL QH301.P535).

0476

Influence of cadmium on water relations, stomatal resistance, and abscisic acid content in expanding bean leaves.
PLPHA. Poschenrieder, C. Gunse, B.; Barcelo, J. Rockville, Md. : American Society of Plant Physiologists. Ten day old bush bean plants (Phaseolus vulgaris L. cv contender) were used to analyze the effects of 3 micromolar Cd in the time courses of expansion growth, dry weight, leaf water stations, stomatal resistance, and abscisic acid (ABA) levels in spots and leaves. Control and Cd-treated plants were grown for 44 hours in nutrient solution. Samples were taken at 24 hour intervals. At the 96 and 144 hour harvests, additional measurements were made on excised leaves which were allowed to dry for 2 hours. From the 48 hour harvest, Cd-treated plants showed lower leaf relative water contents and higher stomatal resistances than controls. At the same time, root and leaf expansion growth, but not dry weight, was significantly reduced. The turgor potentials of leaves from Cd-treated plants were nonsignificantly higher than those of control leaves. A significant increase (almost 400%) of the leaf ABA concentration was detected after 120 hours exposure to Cd. But Cd was found to inhibit ABA accumulation during drying to excised leaves. It is concluded that Cd-induced increase of expansion growth is not due to turgor decrease. The possible mechanisms of Cd-induced stomatal closure are discussed. Plant physiology. Aug 1989. v. 90 (4). p. 1365-1371. Includes references. (NAL Call No.: DNAL 450 P692).

0477

The influence of dark adaptation temperature on the reappearance of variable fluorescence following illumination.
PLPHA. Peeler, T.C. Naylor, A.W. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Jan 1988. v. 86 (1). p. 152-154. Includes references. (NAL Call No.: DNAL 450 P692).

0478

Influence of ethylene produced by soil microorganisms on etiolated pea seedlings.
APMBA. Arshad, M. Frankenberger, W.T. Jr. Washington, D.C. : American Society for Microbiology. There is indirect evidence that soil microorganisms producing ethylene (C_2H_4) can influence plant growth and development, but unequivocal proof is lacking in the literature. A laboratory study was conducted to demonstrate the validity of this speculation. Four experiments were carried out to observe the characteristic "triple" response of etiolated pea seedlings to C_2H_4 microbially derived from L-methionine as a substrate in the presence or absence of Ag(I), a potent inhibitor of C_2H_4 action. In two experiments, the combination of L-methionine and Acremonium falciforme (as an inoculum) was used, while in another study the indigenous soil microflora was responsible for C_2H_4 production. A standardized experiment was conducted with C_2H_4 gas to compare the contribution of the microflora to plant growth. In all cases, etiolated pea seedlings exhibited the classical triple response, which includes reduction in elongation, swelling of the hypocotyl, and a change in the direction of growth (horizontal). The presence of Ag(I) afforded protection to the pea seedlings against the microbially derived C_2H_4. This study demonstrates that microbially produced C_2H_4 in soil can influence plant growth. Applied and environmental microbiology. Nov 1988. v. 54 (11). p. 2728-2732. ill. Includes references. (NAL Call No.: DNAL 448.3 AP5).

0479

Influence of flooding on root morphological components of young black beans.
JOSHB. Kahn, B.A. Stoffella, P.J.; Sandsted, R.F.; Zobel, R.W. Alexandria, Va. : The Society. Journal of the American Society for Horticultural Science. Sept 1985. v. 110 (5). p. 623-627. Includes references. (NAL Call No.: DNAL 81 SO12).

0480

Influence of garden symphylan (Symphyla: Scutigerellidae) root injury on physiological processes in snap beans.
EVETEX. Eltoum E.M.A. Berry, R.E. College Park, Md. : Entomological Society of America. Environmental entomology. Aug 1985. v. 14 (4). p. 408-412. Includes references. (NAL Call No.: DNAL QL461.E532).

0481

Influence of mycorrhizal fungi and Rhizobium inoculation on chickpea and growth characteristics of lumen bacteria.
Varma, A.K. Singh, K.; Peck, H.D. Jr. Corvallis, Or. : Oregon State University , Forest Research Laboratory, 1985. Proceedings of the 6th North American Conference on Mycorrhizae : June 25-29, 1984, Bend, Oregon / compiled and edited by Randy Molina ; sponsoring institutions, Oregon State University, College of Forestry, and USDA. p. 234. ill. Includes references. (NAL Call No.: DNAL aQK604.N6 1984).

0482

Influence of SC-0620 on germination, growth, pigment synthesis and biomass synthesis.
PPGGD. Devlin, R.M. Koszanski, Z.K. Lake Alfred : The Society. Proceedings annual meeting - Plant Growth Regulator Society of America. 1986. (13th). p. 157-161. Includes references. (NAL Call No.: DNAL SB128.P5).

0483

Influence of temperature and plant water status on pollen viability in beans.
JOSHB. Weaver, M.L. Timm, H. Alexandria, Va. : The Society. Journal of the American Society for Horticultural Science. Jan 1988. v. 113 (1). p. 31-35. Includes references. (NAL Call No.: DNAL 81 SO12).

0484

Influence of the Bradyrhizobium japonicum hydrogenase on the growth of Glycine and Vigna species.
APMBA. Drevon, J.J. Kalia, V.C.; Heckmann, M.O.; Salsac, L. Washington, D.C. : American Society for Microbiology. Applied and environmental microbiology. Mar 1987. v. 53 (3). p. 610-612. Includes references. (NAL Call No.: DNAL 448.3 AP5).

0485

Influence of the experimental growth regulator SC-0046 on several plant growth systems.
PPGGD. Devlin, R.M. Koszanski, Z.K. Lake Alfred : The Society. Proceedings annual meeting - Plant Growth Regulator Society of America. 1985. (12th). p. 55-59. Includes references. (NAL Call No.: DNAL SB128.P5).

0486

Influence of total soluble salt concentration on growth and elemental concentration of winged bean seedlings, Psophocarpus tetragonolobus (L.) DC.
CSOSA2. Csizinszky, A.A. New York, N.Y. : Marcel Dekker. Communications in soil science and plant analysis. Sept 1986. v. 17 (9). p. 1009-1018. Includes references. (NAL Call No.: DNAL S590.C63).

0487

Influence of triazole growth regulators and GA3 on in vitro differentiation from moth bean callus.
PPGGD. Gehlot, H.S. Davis, T.D.; Sankhla, A.; Sankhla, D.; Upadhyaya, A.; Sankhla, N. Lake Alfred, Fla. : The Society. Proceedings annual meeting - Plant Growth Regulator Society of America. 1987. (14th). p. 103-107. Includes references. (NAL Call No.: DNAL SB128.P5).

0488

Influence of triazole growth retardants on adventitious root formation in bean hypocotyl cuttings.
PPGGD. Davis, T.D. Lake Alfred : The Society. Proceedings annual meeting - Plant Growth Regulator Society of America. 1986. (13th). p. 217-223. Includes references. (NAL Call No.: DNAL SB128.P5).

0489

Influence of water stress on nitrogen fixation in cowpea.
JOSHB. Walker, D.W. Miller, J.C. Jr. Alexandria, Va. : The Society. Journal of the American Society for Horticultural Science. May 1986. v. 1t1 (3). p. 451-458. Includes references. (NAL Call No.: DNAL 81 SO12).

0490

Inheritance of low temperature tolerance in beans at several growth stages.
Dickson, M.H. Petzoldt, R. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. Mar 1986. v. 29. p. 7-8. (NAL Call No.: DNAL SB327.A1B5).

0491

Inhibition of activity of the ethylene-forming enzyme by alpha(p-chlorophenoxy)isobutyric acid.
JPGRDI. Trebitsh, T. Riov, J. New York, N.Y. : Springer. Journal of plant growth regulation. 1987. v. 5 (4). p. 207-215. Includes references. (NAL Call No.: DNAL QK745.J6).

0492

Inhibition of ATP-dependent proton pumping in plant tonoplast- and plasmalemma-enriched fractions caused by mycochromone.
NASSD. Macri, F. Vianello, A.; Cocucci, M.C. New York, N.Y. : Plenum Press. NATO advanced science institutes series : Series A : Life sciences. In the series analytic: Plant vacuoles: their importance in solute compartmentation in cells and their applications in plant biotechnology / edited by B. Marin. Proceedings of a Workshop, July 6-11, 1986, Sophia-Antipolis, France. 1987. 134. p. 215-218. Includes references. (NAL Call No.: DNAL QH301.N32).

0493

Inhibition of fatty acid biosynthesis in isolated bean and maize chloroplasts by herbicidal phenoxy-phenoxypropionic acid derivatives and structurally related compounds.
PCBPB. Hoppe, H.H. Zacher, H. Duluth, Minn. : Academic Press. Pesticide biochemistry and physiology. Dec 1985. v. 24 (3). p. 298-305. Includes references. (NAL Call No.: DNAL SB951.P49).

0494

Inhibition of glycine oxidation by carboxymethoxylamine, methoxylamine, and acethydrazide.
PLPHA. Sarojini, G. Oliver, D.J. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Mar 1985. v. 77 (3). p. 786-789. Includes 18 references. (NAL Call No.: DNAL 450 P692).

0495

Inhibition of mung bean UDP-glucose: (1 leads to 3)-beta-glucan synthase by UDP-pyridoxal: evidence for an active-site amino group.
PLPHA. Read, S.M. Delmer, D.P. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Dec 1987. v. 85 (4). p. 1008-1015. Includes references. (NAL Call No.: DNAL 450 P692).

0496

Inhibition of photosystem II precedes thylakoid membrane lipid peroxidation in bisulfite-treated leaves of Phaseolus vulgaris.
PLPHA. Covello, P.S. Chang, A.; Dumbroff, E.B.; Thompson, J.E. Rockville, Md. : American Society of Plant Physiologists. Exposure of leaves to SO2 or bisulfite is known to induce peroxidation of thylakoid lipids and to inhibit photosynthetic electron transport. In the present study, we have examined the temporal relationship between bisulfite-induced thylakoid lipid peroxidation and inhibition of electron transport in an attempt to clarify the primary mechanism of SO2 phytotoxicity. Primary leaves of bean (Phaseolus vulgaris L. cv Kinghorn) were floated on a solution of NaHSO3, and the effects of this treatment on photosynthetic electron transport were determined in vivo by measurements of chlorophyll a fluorescence induction and in vitro by biochemical measurements of the light reactions using isolated thylakoids. Lipid peroxidation in treated leaves was followed by monitoring ethane emission from leaf segments and by measuring changes in fatty acid composition and lipid fluidity in isolated thylakoids. A 1 hour treatment with bisulfite inhibited photosystem II (PSII) activity by 70% without modifying Photosystem I, and this inhibitory effect was not light-dependent. By contrast, lipid peroxidation was not detectable until after the inhibition of PSII and was strongly light dependent. This temporal separation of events together with the differential effect of light suggests that bisulfite-induced inhibition of PSII is not a secondary effect of lipid peroxidation and that bisulfite acts directly on one or more components of PSII. Plant physiology. Aug 1989. v. 90 (4). p. 1492-1497. Includes references. (NAL Call No.: DNAL 450 P692).

0497

Inhibition of phytochrome synthesis by gabaculine.
PLPHA. Gardner, G. Gorton, H.L. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Mar 1985. v. 77 (3). p. 540-543. Includes 24 references. (NAL Call No.: DNAL 450 P692).

0498

Inhibition of phytochrome synthesis by the transaminase inhibitor, 4-amino-5-fluoropentanoic acid.
PLPHA. Gardner, G. Gorton, H.L.; Brown, S.A. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. May 1988. v. 87 (1). p. 8-10. Includes references. (NAL Call No.: DNAL 450 P692).

0499

Inhibition of the K+-stimulated ATPase of the phasmalemma of pinto bean leaves by ozone.
PLPHA. Dominy, P.J. Heath, R.L. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Jan 1985. v. 77 (1). p. 43-45. ill. Includes 15 references. (NAL Call No.: DNAL 450 P692).

0500

Inhibition of 2-oxoglutarate oxidation in plant mitochondria by pyruvate.
BBRCA. Dry, I.B. Wiskich, J.T. Orlando, Fla. : Academic Press. Biochemical and biophysical research communications. Dec 17, 1985. v. 133 (2). p. 397-403. Includes references. (NAL Call No.: DNAL 442.8 B5236).

0501

Intact chloroplasts show Ca2+-gated switching between localized and delocalized proton gradient energy coupling (ATP formation).
PLPHA. Chiang, G.G. Dilley, R.A. Rockville, Md. : American Society of Plant Physiologists. Intact chloroplasts were compared to isolated thylakoids as to whether storage of the organelle in high KCl medium caused the energy coupling reactions to show a delocalized or a localized proton gradient energy coupling response. With isolated thylakoids, the occurrence of one or the other energy coupling mode can be reversibly controlled by the concentration of mono- and divalent cations used for the thylakoid storage media. Calcium was shown to be the key ion and previous evidence suggested a Ca2+-controlled gating of H+ fluxes in the thylakoid membrane system (G Chiang, RA Dilley 1987 Biochemistry 26:4911-4916). Isolated, intact chloroplasts, which retained the outer envelope membranes during the 30 min or longer storage treatments in various concentrations of KCl and CaCl2 (with sorbitol to maintain iso-osmotic conditions), were osmotically burst in a reaction cuvette and within 3 minutes were assayed for either a localized or a delocalized proton gradient energy coupling (ATP formation) mode. The intact chloroplast system was analogous to isolated thylakoids, with regard to the effects of KCl and CaCl2 on the energy coupling mode. For example, adding 100 millimolar KCl to the intact organelle storage medium resulted in the subsequent ATP formation assay showing delocalized proton gradient coupling just as with isolated thylakoids. Adding 5 millimolar CaCl2 to the 100 millimolar KCl storage medium resulted in a localized proton gradient coupling mode. Suspending thylakoids in stromal material previously isolated from intact chloroplast preparations and testing the energy coupling response showed that the stromal milieu has enough CA2a to cause the localized coupling response even though there was about 80 millimolar K+ in the intact chloroplasts used in this study (determined by atomic absorption spectrophotometry). Extrapolating the intact chloroplast data to the whole leaf level, we suggest that proton gradient energy coupling is normally of the localized. Plant physiology. Aug 1989. v. 90 (4). p. 1513-1523. ill. Includes references. (NAL Call No.: DNAL 450 P692).

0502

Interactions between nitrate reduction and nitrogen fixation in grain legumes.
Neyra, C.A. Stephens, B.D. Rockville, Md. : American Society of Plant Physiologists, c1985. Exploitation of physiological and genetic variability to enhance crop productivity / edited by James E. Harper, Lawrence E. Schrader, and Robert W. Howell. Literature review. p. 12-22. Includes 59 references. (NAL Call No.: DNAL SB189.4.E97).

0503

Internode length in Pisum. Gene na may block gibberellin synthesis between ent-7 alpha-hydroxykaurenoic acid and gibberellin A12-aldehyde.
PLPHA. Ingram, T.J. Reid, J.B. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Apr 1987. v. 83 (4). p. 1048-1053. Includes references. (NAL Call No.: DNAL 450 P692).

0504

Interspecific hybridization in Phaseolus: embryo culture.
Crocomo, O.J. Cabral, J.B. Columbus : Ohio State University Press, 1986. Biotechnology of plants and microorganisms / edited by O.J. Crocomo ... et al. . p. 85-96. Includes references. (NAL Call No.: DNAL TP248.6.B557).

0505

Interspecific variation in SO2 flux. Leaf surface versus internal flux, and components of leaf conductance.
PLPHA. Olszyk, D.M. Tingey, D.T. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Dec 1985. v. 79 (4). p. 949-956. Includes 29 references. (NAL Call No.: DNAL 450 P692).

0506

Intracellular localization of calmodulin on embryonic axes of Cicer arietinum L.
NASSD. Hernandez-Nistal, J. Aldasaro, J.J.; Rodriguez, D.; Babiano, J.; Nicolas, G. New York, N.Y. : Plenum Press. NATO advanced science institutes series : Series A : Life sciences. Paper presented at the workshop on "Molecular and Cellular Aspects of Calcium in Plant Development," July 15-19, 1985,

Edinburgh, Scotland. 1985. v. 104. p. 313-315. Includes references. (NAL Call No.: DNAL QH301.N32).

0507

Involvement of superoxide radical in extracellular ferric reduction by iron-deficient bean roots.
PLPHA. Cakmak, I. Van de Wetering, D.A.M.; Marschner, H.; Bienfait, H.F. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Sept 1987. v. 85 (1). p. 310-314. Includes references. (NAL Call No.: DNAL 450 P692).

0508

Iron deficiency decreases suberization in bean roots through a decrease in suberin-specific peroxidase activity.
PLPHA. Sijmons, P.C. Kolattukudy, P.E.; Bienfait, H.F. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. May 1985. v. 78 (1). p. 115-120. ill. Includes 27 references. (NAL Call No.: DNAL 450 P692).

0509

Iron metabolism in higher plants: the influence of nutrient iron on bean leaf lipoxygenase.
JPNUDS. Boyer, R.F. VanderPloeg, J.R. New York, N.Y. : Marcel Dekker. Journal of plant nutrition. 1986. v. 9 (12). p. 1585-1600. Includes 30 references. (NAL Call No.: DNAL QK867.J67).

0510

Isoflavonoid formation as an indicator of UV stress in bean (Phaseolus vulgaris L.) leaves. The significance of photorepair in assessing potential damage by increased solar UV-B radiation.
PLPHA. Beggs, C.J. Stolzer-Jehle, A.; Wellmann, E. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Nov 1985. v. 79 (3). p. 630-634. Includes 30 references. (NAL Call No.: DNAL 450 P692).

0511

Isolation and characterization of tonoplast from chilling-sensitive etiolated seedlings of Vigna radiata L.
PLPHA. Yoshida, S. Kawata, T.; Uemura, M.; Niki, T. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Jan 1985. v. 80 (1). p. 161-166. ill. Includes 28 references. (NAL Call No.: DNAL 450 P692).

0512

Isolation and partial characterization of a subtilisin inhibitor from the mung bean (Vigna radiata).
PLPHA. Kapur, R. Tan-Wilson, A.L.; Wilson, K.A. Rockville, Md. : American Society of Plant Physiologists. The subtilisin inhibitior (MBSI-A) from the mung bean (Vigna radiata (L.) Wilczek) seed has been purified to homogeneity. MBSI-A consists of a single polypeptide chain of 119 residues, with a high content of glutamic acid/glutamine, aspartic acid/asparagine, valine, threonine, and proline (19, 12, 10, 9, and 8 residue percent, respectively). MBSI-A is a potent inhibitor of subtilisin Carlsberg, but is inactive toward bovine trypsin and alpha-chymotrypsin and the plant cysteinyl proteinase papain. The MBSI is located exclusively in the cytosol of the seed cotyledon cell, unlike the mung bean trypsin inhibitor (MBTI), which is located primarily in the protein bodies. Both MBSI and MBTI and accumulate in the seed during the most active period of reserve protein accumulation, 12 to 18 days after flowering. During germination MBSI, like MBTI, is broken down beginning 2 to 3 days after seed imbition. The disappearance of MBSI-A is accompanied by the transient appearance of a new inhibitor species, MBSI-D. The amino acid composition of MBSI-D suggests that it may be produced by the loss of approximately 20 amino acid residues from MBSI-A. Plant physiology. Sept 1989. v. 91 (1). p. 106-112. ill. Includes references. (NAL Call No.: DNAL 450 P692).

0513

Isolation of coumarin in snap beans and its effect on uredospore germination.
JAFCAU. Meredith, F.I. Thomas, C.A.; Horvat, R.J. Washington, D.C. : American Chemical Society. Journal of agricultural and food chemistry. May/June 1986. v. 34 (3). p. 456-458. Includes references. (NAL Call No.: DNAL 381 J8223).

0514

Joint action of O3 and SO2 in modifying plant gas exchange.
PLPHA. Olszyk, D.M. Tingey. D.T. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Oct 1986. v. 82 (2). p. 401-405. Includes references. (NAL Call No.: DNAL 450 P692).

0515

K+ regulates bacteroid-associated functions of Bradyrhizobium.
PNASA. Gober, J.W. Kashket, E.R. Washington, D.C. : The Academy. Proceedings of the National Academy of Sciences of the United States of America. July 1987. v. 84 (13). p. 4650-4654. Includes references. (NAL Call No.: DNAL 500 N21P).

0516

Kinetic studies on the control of the bean rust fungus (Uromyces phaseoli L.) by an inhibitor of polyamine biosynthesis.
PLPHA. Rajam, M.V. Weinstein, L.H.; Galston, A.W. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Oct 1986. v. 82 (2). p. 485-487. ill. Includes references. (NAL Call No.: DNAL 450 P692).

0517

Leaf conductance in relation to rate of CO2 assimilation. II. Effects of short-term exposures to different photon flux densities.
PLPHA. Wong, S.C. Cowan, I.R.; Farquhar, G.D. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Aug 1985. v. 78 (4). p. 826-829. Includes 5 references. (NAL Call No.: DNAL 450 P692).

0518

Leaf conductance in relation to rate of CO2 assimilation. III. Influences of water stress and photoinhibition.
PLPHA. Wong, S.C. Cowan, I.R.; Farquhar, G.D. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Aug 1985. v. 78 (4). p. 830-834. Includes 16 references. (NAL Call No.: DNAL 450 P692).

0519

Leaf water potential and crop color change in water-stressed peas.
HJHSA. Oosterhuis, D.M. Le Maire, F.; Le Maire, C. Alexandria, Va. : American Society for Horticultural Science. HortScience. June 1987. v. 22 (3). p. 429-431. ill. Includes references. (NAL Call No.: DNAL SB1.H6).

0520

Light effects on several chloroplast components in norflurazon-treated pea seedlings.
PLPHA. Sagar, A.D. Horwitz, B.A.; Elliott, R.C.; Thompson, W.F.; Briggs, W.R. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Oct 1988. v. 88 (2). p. 340-347. ill. Includes references. (NAL Call No.: DNAL 450 P692).

0521

Light quality regulates expression of chloroplast genes and assembly of photosynthetic membrane complexes.
PNASA. Glick, R.E. McCauley, S.W.; Gruissem, W.; Melis, A. Washington, D.C. : The Academy. Proceedings of the National Academy of Sciences of the United States of America. June 1986. v. 83 (12). p. 4287-4291. Includes 34 references. (NAL Call No.: DNAL 500 N21P).

0522

Localization and conditional redundancy of regulatory elements in rbcS-3A, a pea gene encoding the small subunit of ribulose-bisphosphate carboxylase.
PNASA. Kuhlemeier, C. Cuozzo, M.; Green, P.J.; Goyvaerts, E.; Ward, K.; Chua, N.H. Washington, D.C. : The Academy. Proceedings of the National Academy of Sciences of the United States of America. July 1988. v. 85 (13). p. 4662-4666. ill. Includes references. (NAL Call No.: DNAL 500 N21P).

0523

Long-term tillage and crop rotation effects on bulk density and soil impedance in northern Idaho.
SSSJD4. Hammel, J.E. Madison, Wis. : The Society. Conservation tillage management for winter wheat (Triticum aestivum L.) production in northern Idaho may increase bulk density (Pb) and soil impedance (SI) of surface layers and limit crop growth, particularly when combined with spring cropping practices which require cultural or tillage operations during moist soil conditions. Bulk density and SI were measured in a long-term tillage-crop rotation experiment after 10 yr of continuous management to determine if differences resulting from tillage or cropping practices existed. Soils of the experimental site were two similar series, Palouse (fine-silty, mixed, mesic Pachic Ultic Haploxeroll) and Naff (fine-silty, mixed, mesic Ultic Argixeroll) silt loams. Tillage treatments included conventional (CON, moldboard plow), minimum (MIN, chisel), and no-tillage (NOT). Crop rotations were a 2-yr winter wheat-spring pea (Pisum sativum L.) rotation and a 3 yr winter-spring barley (Hordeum vulgare L.)-spring pea rotation. Bulk density was determined on intact cores using gamma attenuation. Soil impedance was measured with a constant-rate penetrometer. Tillage had a significant ($P < 0.05$) effect on pb, but not SI. Crop rotation did not significantly influence either soil property. The main effect of depth and a tillage X depth interaction, however, produced significant ($P < 0.01$) differences on pb, and SI. Both MIN and NOT had SI values exceeding 1.5 MPa at a depth of 0.05 to 0.15 m, which were 0.5 to 1.0 MPa greater than CON. Higher SI values under reduced tillage while not preventing root growth may, when combined with cool, wet soil conditions during the spring, limit root function and decrease crop growth potential. Soil Science Society of America journal. Sept/Oct 1989. v. 53 (5). p. 1515-1519. Includes references. (NAL Call No.: DNAL 56.9 SO3).

0524

Low-temperature fluorescence emission changes in thylakoids induced by acetyl glyceryl ether phosphorylcholine (AGEPC).
ABBIA. Argyroudi-Akoyunoglou, J.H. Vakirtzi-Lemonias, C. Duluth, Minn. : Academic Press. Archives of biochemistry and biophysics. Feb 15, 1987. v. 253 (1). p. 38-47. Includes references. (NAL Call No.: DNAL 381 AR2).

0525

Low temperature induces galactinol synthase in leaves and seeds kidney bean and soybean.
Castillo, E.M. Lumen, B.O. de; Reyes, P.S. Fort Collins, Colo : Howard F. Schwartz, Colorado State University. Annual report of the Bean Improvement Cooperative. 1989. v. 32. p. 39. Includes references. (NAL Call No.: DNAL SB327.A1B5).

0526

Manipulating membrane fatty acid compositions of whole plants tween-fatty acid esters.
PLPHA. Terzaghi, W.B. Rockville, Md. : American Society of Plant Physiologists. This paper describes a method for manipulating plant membrane fatty acid compositions without altering growth temperature or other conditions. Tween-fatty acid esters carrying specific fatty acids were synthesized and applied to various organs of plants growing axenically in glass jars. Treated plants incorporated large amounts of exogenous fatty acids into all acylated membrane lipids detected. Fatty acids were taken up by both roots and leaves. Fatty acids applied to roots were found in leaves, while fatty acids applied to leaves appeared in both leaves higher on the plant and in roots, indicating translocation (probably in the phloem). Foliar application was most effective; up to 20% of membrane fatty acids of leaves above the treated leaf and up to 40% of root membrane fatty acids were exogenously derived. Plants which took up exogenous fatty acids changed their patterns of fatty acid synthesis such that ratios of saturated to unsaturated fatty acids remained essentially unaltered. Fatty acids uptake was most extensively studied in soybean (Glycine max L. Merr.), but was also observed in other species, including maize (Zea mays L.), mung beans (Vigna radiata L.), peas (Pisum sativum L.), petunia (Petunia hybrida L.) and tomato (Lycopersicon esculentum Mill.). Potential applications of this system include studying internal transport of fatty acids, regulation of fatty acid and membrane synthesis, and influences of membrane fatty acid composition on plant physiology. Plant physiology. Sept 1989. v. 91 (1). p. 203-212. ill. Includes references. (NAL Call No.: DNAL 450 P692).

0527

Maternal investment and fruit abortion in Phaseolus vulgaris.
AJBOA. Nakamura, Robert R. Baltimore, Md. : Botanical Society of America. American journal of botany. July 1986. v. 73 (7). p. 1049-1057. Includes references. (NAL Call No.: DNAL 450 AM36).

0528

Measurement and interpretation of leaf wetness in a bean crop.
Weiss, A. Lukens, D.L.; Steadman, J.R. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. Mar 1985. v. 28. p. 25-26. Includes references. (NAL Call No.: DNAL SB327.A1B5).

0529

Mechanism of gibberellin-dependent stem elongation in peas.
PLPHA. Cosgrove, D.J. Sovonick-Dunford, S.A. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Jan 1989. v. 89 (1). p. 184-191. ill. Includes references. (NAL Call No.: DNAL 450 P692).

0530

Mechanisms of differential inhibitory effects of sodium sulfanilate on folic acid biosynthesis in plants.
PCBPB. Lin, K.H. Zhang, L.H. Duluth, Minn. Academic Press. Pesticide biochemistry and physiology. Sept 1988. v. 32 (1). p. 17-24. Includes references. (NAL Call No.: DNAL SB951.P49).

0531

Metabolism of N-hydroxymethyl dimethoate and N-desmethyl dimethoate in bean plants.
PCBPB. Garner, W.Y. Menzer, R.E. Duluth, Minn. : Academic Press. Pesticide biochemistry and physiology. Apr 1987. v. 25 (2). p. 218-232. ill. Includes references. (NAL Call No.: DNAL SB951.P49).

0532

Mild water stress effects on carbon-reduction-cycle intermediates, ribulose bisphosphate carboxylase activity, and spatial homogeneity of photosynthesis in intact leaves.
PLPHA. Sharkey, T.D. Seemann, J.R. Rockville, Md. : American Society of Plant Physiologists. We have examined the effect of mild water stress on photosynthetic chloroplast reactions of intact Phaseolus vulgaris leaves by measuring two parameters of ribulose bisphosphate (RuBP) carboxylase activity and

the pool sizes of RuBP, 3-phosphoglycerate (PGA), triose phosphates, hexose monophosphates, and ATP. We also tested for patchy stomatal closure by feeding 14CO2. The k(cat) of RuBP carboxylase (moles CO2 fixed per mole enzyme per second) which could be measured after incubating the enzyme with CO2 and Mg2+ was unchanged by water stress. The ratio of activity before and after incubation with CO2 and Mg2+ (the carbamylation state) was slightly reduced by severe stress but not by mild stress. Likewise, the concentration of RuBP was slightly reduced by severe stress but not by mild stress. The concentration of PGA was markedly reduced by both mild and severe water stress. The concentration of triose phosphates did not decline as much as PGA. We found that photosynthesis in water stressed leaves occurred in patches. The patchiness of photosynthesis during water stress may lead to an underestimation of the effect of stomatal closure. We conclude that reductions in whole leaf photosynthesis caused by mild water stress are primarily the result of stomatal closure and that there is no indication of damage to chloroplast reactions. Plant physiology. Apr 1989. v. 89 (4). p. 1060-1065. ill. Includes references. (NAL Call No.: DNAL 450 P692).

0533

Mild water stress of Phaseolus vulgaris plants leads to reduced starch synthesis and extractable sucrose phosphate synthase activity.
PLPHA. Vassey, T.L. Sharkey, T.D. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Apr 1989. v. 89 (4). p. 1066-1070. Includes references. (NAL Call No.: DNAL 450 P692).

0534

Modification of dimethipin action by light.
JPGRDI. Keng, J. Metzger, J.D. New York, N.Y. : Springer. Journal of plant growth regulation. 1987. v. 6 (1). p. 23-32. ill. Includes references. (NAL Call No.: DNAL QK745.J6).

0535

Modulation of pea membrane beta-glucan synthase activity by calcium, polycation, endogenous protease, and protease inhibitor.
PLPHA. Girard, V. Maclachlan, G. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Sept 1987. v. 85 (1). p. 131-136. Includes references. (NAL Call No.: DNAL 450 P692).

0536

Moisture absorption by Phaseolus bean mixtures.
Edje, O.T. Adams, M.W. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. Mar 1985. v. 28. p. 119-120. (NAL Call No.: DNAL SB327.A1B5).

0537

Monoclonal antibodies to the light-harvesting chlorophyll a/b protein complex of photosystem II.
JCLBA3. Darr, S.C. Somerville, S.C.; Arntzen, C.J. New York, N.Y. : Rockefeller University Press. The Journal of cell biology. Sept 1986. v. 103 (3). p. 733-740. ill. Includes references. (NAL Call No.: DNAL 442.8 J828).

0538

Morphological and physiological traits associated with agromyzid (Diptera: Agromyzidae) resistance in mungbean.
JEENAI. Talekar, N.S. Yang, H.C.; Lee, Y.H. College Park, Md. : Entomological Society of America. Morphological and physiological characters of three resistant and two susceptible mungbean accessions were studied to understand the nature of their resistance to agromyzid flies. The highly resistant accession had high trichome density on leaves and stems, purplish and smaller diameter stems, and smaller unifoliate leaves. Agromyzid adults showed lower preference for visiting seedlings of resistant compared with susceptible accessions for feeding and oviposition, which were significantly positively correlated with insect infestation. Pupation of the agromyzid was delayed when larvae were feeding inside stems of resistant compared with susceptible accessions. Plant tissues of resistant accessions damaged by agromyzid feeding had significantly fewer larvae and pupae compared with similar tissues of the susceptible accessions. Larvae of Porthesia taiwana Shiraki and Heliothis armigera Hubner had greater mortality and reduced pupation when fed unifoliate leaves of resistant compared with susceptible mungbean accessions. A combination of several characters appears to be responsible for resistance. Journal of economic entomology. Oct 1988. v. 81 (5). p. 1352-1358. Includes references. (NAL Call No.: DNAL 421 J822).

0539

Nature of the semihard seed characteristic in snap beans.
JOSHB. Holubowicz, R. Taylor, A.G.; Goffinet, M.C.; Dickson, M.H. Alexandria, Va. : The Society. Journal of the American Society for Horticultural Science. Mar 1988. v. 113 (2). p. 248-252. ill. Includes references. (NAL Call No.: DNAL 81 S012).

0540

Navy bean seed vigor and field performance in relation to microwave radiation.
AGJOAT. Spilde, L.A. Madison, Wis. : American Society of Agronomy. Agronomy journal. Sept/Oct 1987. v. 79 (5). p. 827-830. Includes references. (NAL Call No.: DNAL 4 AM34P).

0541

New lima bean tolerates drought like a camel.
AGREA. Kaplan, K. Washington, D.C. : The Administration. Agricultural research - U.S. Department of Agriculture, Agricultural Research Service. May 1988. v. 36 (5). p. 9. ill. (NAL Call No.: DNAL 1.98 AG84).

0542

A new technique for crossing mungbeans.
CRPSAY. Cupka, T.B. Edwards, L.H. Madison, Wis. : Crop Science Society of America. Crop science. July/Aug 1986. v. 26 (4). p. 830-831. Includes 3 references. (NAL Call No.: DNAL 64.8 C883).

0543

Nitrate inhibition of legume nodule growth and activity.
PLPHA. Streeter, J.G. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Feb 1985. v. 77 (2). p. 321-324. ill. Includes 17 references. (NAL Call No.: DNAL 450 P692).

0544

Nitrate utilization and dinitrogen fixation (acetylene reduction) by nitrate reductase-deficient mutants of pea.
CRPSAY. Vigue, G.T. Warner, R.L. Madison, Wis. : Crop Science Society of America. Crop science. May/June 1987. v. 27 (3). p. 548-522. Includes references. (NAL Call No.: DNAL 64.8 C883).

0545

Nitric oxide and nitrous oxide production by soybean and winged bean during the in vivo nitrate reductase assay.
PLPHA. Dean, J.V. Harper, J.E. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Nov 1986. v. 82 (3). p. 718-723. Includes references. (NAL Call No.: DNAL 450 P692).

0546

Nitrogen nutrition of nodules in relation to 'N-hunger' in cowpea (Vigna unguiculata L. Walp).
PLPHA. Atkins, C.A. Pate, J.S.; Sanford, P.J.; Dakora, F.D.; Matthews, I. Rockville, Md. : American Society of Plant Physiologists. Early growth, nodule development, and nitrogen fixation by two cultivars of cowpea (Vigna unguiculate L. Walp), one large-seeded (Vita 3; 146.0 +/- 0.9 milligrams seed dry weight, 4.1 +/- 0.2 milligrams seed N), the other small-seeded (Caloona; 57.5 +/- 2.5 milligrams seed dry weight, 1.8 +/- 0.1 milligrams seed N), were compared under conditions of sand culture with nutrient solution free of combined N. The seed stocks used had been obtained from plants uniformly labeled with 15N, thus enabling changes with time in distribution of cotyledon and fixed N among plant parts to be measured by isotope dilution. Caloona, but not Vita 3, showed physiological symptoms of 'N hunger,' i.e. transient loss of chlorophyll (visible yellowing) and from the first-formed unifoliolate leaves at or around the onset of symbiotic functioning and N2 fixation. The smaller-seeded Caloona showed higher early nitrogenase activity than the larger-seeded Vita 3 and by 28 days had fixed 6.6 milligrams of N per milligram of seed N mg N . (mg seed N)-1 versus only 3.5 mg N . (mg seed N)-1 in Vita 3. Both cultivars lost around 30% of their initial seed at germination, mostly as fallen cotyledons. Abscised cotyledons of Caloona contained 1.21 +/- 0.17% N; those of Vita 3 contained 2.61 +/- 0.37% N. When compared on the basis of cotyledon N available for seedling growth, Caloona was shown to have fixed 10.6 mg N . (mg seed N)-1 and Vita 3 only 5.3 mg N . (mg seed N)-1. Most of the cotyledon N withdrawn from the unifoliolate leaf pair of Caloona during 'N-hunger' was committed to early nodule growth and, in total, 20 to 25% of the cotyledon N resource of this cultivar was ultimately invested in establishment of symbiosis compared with only 7% in Vita 3. Plant physiology. Aug 1989. v. 90 (4). p. 1644-1649. Includes references. (NAL Call No.: DNAL 450 P692).

0547

On the nature and origin of the calcium asymmetry arising during gravitropic response in etiolated pea epicotyls.
PLPHA. Migliaccio, F. Galston, A.W. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Oct 1987. v. 85 (2). p. 542-547. ill. Includes references. (NAL Call No.: DNAL 450 P692).

0548

Ontogenetic changes and assimilate partitioning in aborting and nonaborting seeds of Phaseolus vulgaris L.
Sage, T.L. Webster, B.D. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1987. v. 30. p.

82. (NAL Call No.: DNAL SB327.A1B5).

0549

Ontogeny and yield response of common and tepary beans to temperature.
AGJOAT. Scully, B. Waines, J.G. Madison, Wis. : American Society of Agronomy. Temperature affects crop development and yield. In this study the effect of temperature on emergence, vegetative development, and yield of common bean (Phaseolus vulgaris L.) and tepary bean (P. acutifolius A. Gray) was compared. In the growth chamber nine common bean accessions were evaluated for emergence response over planting depths of 25, 50, and 75 mm, and at constant temperatures of 15, 20, 25, 30, and 35 degrees C. The three depths had no significant effect on emergence between 20 and 30 degrees C, but at 15 and 35 degrees C the increased depth significantly delayed emergence. The most rapid germination and emergence occurred at 30 degrees C under these controlled conditions. In the field emergence of the same common bean accessions was compared to tepary bean; tepary bean emerged about 1.5 d earlier than common bean at soil temperatures of 18 to 28 degrees C. The effect of temperature on vegetative development was evaluated by a linear heat unit system that measured base temperature (Tbase) and heat units to flowering. Under field conditions common bean had an average base temperature (Tbase) lower than tepary bean, and required more heat units to flower. Genotypic differences for base temperatures and heat unit requirements existed among accessions within both species when grown at Riverside, CA, on an Arlington fine sandy loam (coarse-loamy, mixed, thermic Haplic Durixeralf). Tepary bean produced higher yields than common bean under hot summer conditions, but lower yields under early spring conditions. Agronomy journal. Nov/Dec 1988. v. 80 (6). p. 921-925. Includes references. (NAL Call No.: DNAL 4 AM34P).

0550

Optimum time of day for maximum flower opening of faba bean.
AGJOAT. De Pace, C. Geng, S.; Filippetti, A.; Ricciardi, L. Madison, Wis. : American Society of Agronomy. Agronomy journal. July/Aug 1985. v. 77 (4). p. 646-649. Includes references. (NAL Call No.: DNAL 4 AM34P).

0551

Origin of growth-induced water potential: solute concentration is low in apoplast of enlarging tissues.
PLPHA. Nonami, H. Boyer, J.S. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Mar 1987. v. 83 (3). p. 596-601. ill. Includes references. (NAL Call No.: DNAL 450 P692).

0552

Oviposition site preference of Lygus hesperus (Hemiptera: Miridae) on common bean in relation to bean age and genotype.
JEENAI. Alvarado-Rodriquez, B. Leigh, T.F.; Foster, K.W. College Park, Md. : Entomological Society of America. Journal of economic entomology. Aug 1986. v. 79 (4). p. 1069-1072. Includes references. (NAL Call No.: DNAL 421 J822).

0553

Oxidative processes in soybean and pea seeds. Effect of light, temperature, and water content.
PLPHA. Vertucci, C.W. Leopold, A.C. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Aug 1987. v. 84 (4). p. 1038-1043. Includes references. (NAL Call No.: DNAL 450 P692).

0554

O2-insensitive photosynthesis in C3 plants. Its occurrence and a possible explanation.
PLPHA. Sharkey, T.D. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. May 1985. v. 78 (1). p. 71-75. Includes 32 references. (NAL Call No.: DNAL 450 P692).

0555

Partitioning of carbon and nitrogen in N2-fixing grain legumes.
Pate, J.S. Boulder, Colo. : Westview Press, 1985. World Soybean Research Conference III : proceedings / edited by Richard Shibles. Literature review. p. 715-727. Includes references. (NAL Call No.: DNAL SB205.S7W6 1984).

0556

Partitioning of nitrogen-15-labeled biologically fixed nitrogen and nitrogen-15-labeled nitrate in cowpea during pod development.
AGJOAT. Douglas, L.A. Weaver, R.W. Madison, Wis. : American Society of Agronomy. Agronomy journal. May/June 1986. v. 78 (3). p. 499-502. Includes references. (NAL Call No.: DNAL 4 AM34P).

0557

A pea mutant for the study of hydrotropism in roots.
SCIEA. Jaffe, M.J. Takahashi, H.; Biro, R.L. Washington, D.C. : American Association for the Advancement of Science. Science. Oct 25, 1985. v. 230 (4724). p. 445-447. ill. Includes

references. (NAL Call No.: DNAL 470 SCI2).

0558

Pea saponins in the pea--Fusarium solani interaction.
EXMYD. Christian, D.A. Hadwiger, L.A. Duluth, Minn. : Academic Press. Experimental mycology. Dec 1989. v. 13 (4). p. 419-427. Includes references. (NAL Call No.: DNAL QK600.E9).

0559

Pea seedling HMG-COA reductases: regulation of activity in vitro by phosphorylation and Ca2+ and postranslational control in vivo by phytochrome and isoprenoid hormones.
Russell, D.W. Knight, J.S.; Wilson, T.M. Columbia, Mo. : The Interdisciplinary Plant Biochemistry and Physiology Program. Current topics in plant biochemistry and physiology : Proceedings of the ... Plant Biochemistry and Physiology Symposium held at the University of Missouri, Columbia. 1985. v. 4. p. 191-206. ill. Includes 20 references. (NAL Call No.: DNAL QK861.P55).

0560

Pea xyloglucan and cellulose. V. **Xyloglucan-cellulose interactions in vitro and in vivo.**
PLPHA. Hayashi, T. Marsden, M.P.F.; Delmer, D.P. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Feb 1987. v. 83 (2). p. 384-389. ill. Includes references. (NAL Call No.: DNAL 450 P692).

0561

Phaseolus vulgaris growth in an ammonium-based nutrient solution with variable calcium.
AGJOAT. Fenn, L.B. Taylor, R.M.; Horst, G.L. Madison, Wis. : American Society of Agronomy. Agronomy journal. Jan/Feb 1987. v. 79 (1). p. 89-91. Includes references. (NAL Call No.: DNAL 4 AM34P).

0562

Phenylalanyl-tRNA synthetase from chloroplasts of a higher plant (Phaseolus vulgaris).
JBCHA3. Rauhut, R. Gabius, H.J.; Cramer, F. Baltimore, Md. : American Society of Biological Chemists. The Journal of biological chemistry. Feb 25, 1986. v. 261 (6). p. 2799-2803. Includes 60 references. (NAL Call No.: DNAL 381 J824).

0563

Photoassimilate partitioning to Phaseolus vulgaris L. fruits.
Sage, T.L. Webster, B.D. Fort Collins, Colo : Howard F. Schwartz, Colorado State University. Annual report of the Bean Improvement Cooperative. 1989. v. 32. p. 29-30. Includes references. (NAL Call No.: DNAL SB327.A1B5).

0564

Photoinhibition at low temperature in chilling-sensitive and -resistant plants.
PLPHA. Hetherington, S.E. He, J.; Smillie, R.M. Rockville, Md. : American Society of Plant Physiologists. Photoinhibition resulting from exposure at 7 degrees C to a moderate photon flux density (300 micromoles per square meter per second, 400-700 nanometers) for 20 hours was measured in leaves of annual crops differing widely in chilling tolerance. The incidence of photoinhibition, determined as the decrease in the ratio of induced to total chlorophyll fluorescence emission at 693 nanometers (Fv/Fmax) measured at 77 Kelvin, was not confined to chilling-sensitive species. The extent of photoinhibition in leaves of all chilling-resistant plants tested (barley Hordeum vulgare L. , broad bean Vicia faba L. , pea Pisum sativum L. , and wheat Triticum aestivum L.) was about half of that measured in chilling-sensitive plants (bean Phaseolus vulgaris L. , cucumber Cucumis sativus L. , lablab Lablab purpureus L. , maize Zea mays L. , pearl millet Pennisetum typhoides (Burm. F.) Stapf & Hubbard , pigeon pea Cajanus cajun (L.) Millsp. , sesame Sesamum indicum L. , sorghum Sorghum bicolor L. Moench , and tomato Lycopersicon esculentum Mill.). Rice (Oryza sativa L.) leaves of the indica type were more susceptible to photoinhibition at 7 degrees C than leaves of the japonica type. Photoinhibition was dependent both on temperature and light, increasing nonlinearly with decreasing temperature and linearly with increasing light intensity. In contrast to photoinhibition during chilling, large differences, up to 166-fold, were found in the relative susceptibility of the different species to chilling injury in the dark. It was concluded that chilling temperatures increased the likelihood of photoinhibition in leaves of both chilling-sensitive and -resistant plants. Further, while the photoinhibition during chilling generally occurred more rapidly in chilling-sensitive plants, this was not related directly to chilling sensitivity. Plant physiology. Aug 1989. v. 90 (4). p. 1609-1615. Includes references. (NAL Call No.: DNAL 450 P692).

0565

Photoperiod and light quality effects on cowpea floral development at high temperatures.
CRPSAY. Mutters, R.G. Hall, A.E.; Patel, P.N. Madison, Wis. : Crop Science Society of America. High temperatures in tropical and subtropical zones often have detrimental effects on plants. Plants in these zones experience differences in daylength that could influence sensitivity to heat. Contrasting genotypes of cowpea. Vigna unguiculata (L.) Walp., were grown under fluorescent plus incandescent (F) or metal halide plus incandescent (MH) lamps at different daylengths (11, 12, 13, 14, or 16 h) to determine whether the sensitivity of floral development to high night temperatures is influenced by light quality and photoperiod. Floral bud development was suppressed in heat-sensitive genotype (CB5) at a 14-h photoperiod under MH, while a 16-h photoperiod was required to elicit a similar response under F. Spectral analysis showed five times more ultraviolet-A light (UV-A) (315-400 nm) in MH than in F, but F supplemented with UV-A light did not elicit the same suppression of floral bud development as MH. The reproductive response to long days with hot nights (30 degrees C) was closer to that of field-grown plants under MH than under F. Percent pod set of two sensitive genotypes (CB5 and 7964) subjected to high temperatures (33/30 degrees C day/night) was higher (23 and 19%) at an 11-h photoperiod than at a 14-h photoperiod (5%) under F. No pod set occurred in an 11-h photoperiod with red light (R) during the night. Substantial pod set (41%) was observed when a 14-h photoperiod was followed by far-red light (FR). The effect was reversed when FR was immediately followed by R. Apparently, pod set at high night temperatures in heat-sensitive, day-neutral cowpea is dependent on photoperiod through a mechanism involving phytochrome. Crop science. Nov/Dec 1989. v. 29 (6). p. 1501-1505. Includes references. (NAL Call No.: DNAL 64.8 C883).

0566

Photoperiod modification of 14C Gibberellin A12 aldehyde metabolism in shoots of pea, Line G2.
PLPHA. Davies, P.J. Birnberg, P.R.; Maki, S.L.; Brenner, M.L. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Aug 1986. v. 81 (4). p. 991-996. Includes 22 references. (NAL Call No.: DNAL 450 P692).

0567

Photosynthesis-associated gene families: differences in response to tissue-specific and environmental factors.
SCIEA. Simpson, J. Van Montagu, M.; Herrera-Estrella, L. Washington, D.C. : American Association for the Advancement of Science. Science. July 4, 1986. v. 233 (4759). p. 34-38. ill. Includes 31 references. (NAL Call No.: DNAL 470 SCI2).

0568

Photosynthetic responses to heat stress in common bean genotypes differing in heat acclimation potential.
CRPSAY. Chaisompongpan, N. Li, P.H.; Davis, D.W.; Markhart, A.H. III. Madison, Wis. : Crop Science Society of America. Photosynthesis is one of the most heat-sensitive processes in plants. The common bean (Phaseolus vulgaris L.) is notoriously sensitive to heat. The objectives of this study were to determine the photosynthetic activities of six common bean genotypes under heat stress and whether these activities correspond with the genotypes' ranking in purported heat acclimation potential (HAP). The HAP is defined as the change in leaf heat tolerance, based on plasmalemma thermostability measured by electrolyte leakage, at the prefloral growth stage of plants after acclimation at 37 degrees C day/night for 24 h. Photosynthetic response to short-term heat stress (5 min at 42 or 45 degrees C) was expressed by O2 evolution and chlorophyll fluorescence. Without heat acclimation, heat stress at 42 degrees C decreased O2 evolution in the six genotypes from 50 to more than 95%, compared with the controls, and heat stress at 45 degrees C almost totally inhibited O2 evolution in all genotypes. Heat stress had less effect on peak fluorescence level than on O2 evolution. Heat acclimation slightly reduced O2 evolution, compared with nonacclimated controls. In heat-acclimated plants, heat stress at 42 degrees C had no effect on O2 evolution, whereas stress at 45 degrees C significantly reduced O2 evolution. Changes in levels of peak fluorescence under heat stress in heat-acclimated plants showed patterns similar to changes in O2 evolution. Photosynthetic responses to heat stress did not total ly correspond with the ranking of HAPs of the six genotypes obtained by conductivity test. Full recovery of O2 evolution from heat injury at 42 degrees C for 5 min occurred within 4 h in GNUI 59, whereas O2 evolution rates were still lower than the controls after 6 h in the other genotypes. The recovery of chlorophyll fluorescene was slower than that of O2 evolution. Crop science. Jan/Feb 1990. v. 30 (1). p. 100-104. Includes references. (NAL Call No.: DNAL 64.8 C883).

0569

Physiological and growth responses of Phaseolus vulgaris and P. acutifolius when grown in fields at two levels of salinity.
Coons, J.M. Pratt, R.C. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1988. v. 31. p. 88-89. Includes references. (NAL Call No.: DNAL SB327.A1B5).

0570

The physiological nature of snap bean semi-hard seeds.
Holubowicz, R. Taylor, A.G.; Goffinet, M.C.; Dickson, M.H. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1987. v. 30. p. 85-86. ill. Includes references. (NAL Call No.: DNAL SB327.A1B5).

0571

Phytohormones, Rhizobium mutants, and nodulation in legumes. VII. Identification and quantification of cytokinins in effective and ineffective pea root nodules using radioimmunoassay.
JPGRDI. Badenoch-Jones, J. Parker, C.W.; Letham, D.S. New York, N.Y. : Springer. Journal of plant growth regulation. 1987. v. 6 (2). p. 97-111. ill. Includes references. (NAL Call No.: DNAL QK745.J6).

0572

A plant cultural system for monitoring evapotranspiration and physiological responses under field conditions.
Tingey, D.T. Moser, T.J.; Zirkle, D.F.; Snow, M.D. Logan, Utah : Utah State Universjty, 1987? . Proceedings of International Conference on Measurement of Soil and Plant Water Status : in commemoration of the centennial of Utah State University, July 6-10, 1987, Logan, Utah. v. 2 p. 139-145. ill. Includes references. (NAL Call No.: DNAL QK870.I5 1987).

0573

Plant growth analysis of field-grown cowpeas.
JOSHB. Fernandez, G.C.J. Miller, J.C. Jr. Alexandria, Va. : The Society. Journal of the American Society for Horticultural Science. Nov 1987. v. 112 (6). p. 1044-1052. Includes references. (NAL Call No.: DNAL 81 SO12).

0574

Plastid development in Pisum sativum leaves during greening. II. Post-translational uptake by plastids as an indicator system to monitor changes in translatable mRNA for nuclear-encoded plastid polypeptides.
PLPHA. Dietz, K.J. Bogorad, L. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Nov 1987. v. 85 (3). p. 816-822. Includes references. (NAL Call No.: DNAL 450 P692).

0575

Pod and seed set of Phaseolus vulgaris L.
Pechan, P.M. Webster, B.D. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. Mar 1986. v. 29. p. 105. (NAL Call No.: DNAL SB327.A1B5).

0576

Pod retention and seed yield of beans in response to chemcial foliar applications.
HJHSA. Weaver, M.L. Timm, H.; Ng, H.; Burke, D.W.; Silbernagel, M.J.; Foster, K. Alexandria, Va. : American Society for Horticultural Science. HortScience. June 1985. v. 20 (3,sectionI). p. 429-431. Includes 16 references. (NAL Call No.: DNAL SB1.H6).

0577

Polyamine metabolism and osmotic stress. 1. Relation to protoplast viability.
PLPHA. Tiburcio, A.F. Masdeu, M.A.; Dumortier, F.M.; Galston, A.W. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Oct 1986. v. 82 (2). p. 369-374. Includes references. (NAL Call No.: DNAL 450 P692).

0578

Possible involvement of phage-like structures in antagonism of cowpea rhizobia by Rhizobium trifolii.
APMBA. Joseph, M.V. Desai, J.D.; Desai, A.J. Washington, D.C. : American Society for Microbiology. Applied and environmental microbiology. Feb 1985. v. 49 (2). p. 459-461. ill. Includes 18 references. (NAL Call No.: DNAL 448.3 AP5).

0579

Potential involvement of alkoxyl and hydroxyl radicals in the peroxidative action of oxyfluorfen.
PCBPB. Upham, B.L. Hatzios, K.K. Duluth, Minn. : Academic Press. Pesticide biochemistry and physiology. June 1987. v. 28 (2). p. 248-256. Includes references. (NAL Call No.: DNAL SB951.P49).

0580

Presence and identification of polyamines in xylem and phloem exudates of plants.
PLPHA. Friedman, R. Levin, N.; Altman, A. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Dec 1986. v. 82 (4). p. 1154-1157. ill. Includes references. (NAL Call No.: DNAL 450 P692).

0581

A probit planes method for analyzing seed deterioration data.
CRPSAY. Wilson, D.O. Jr. McDonald, M.B. Jr.; St Martin, S.K. Madison, Wis. : Crop Science Society of America. Efficient management of seed stocks depends on a accurate description of seed longevity in storage. This work was conducted to study the implementation of the probit analysis method of modeling seed deterioration. Samples of field bean seed (Phaseolus vulgaris L.) were stored at eight temperatures (20-60 degrees C) and four moisture levels (12-24 g H2O kg-1) from 0 to 372 d, and evaluated using the standard germination test. Probit analysis was applied to the entire data set simultaneously using nonlinear regression as well as the conventional environment by environment approach. Nonlinear regression was performed on the germination angles using the model statement: germination angle = arcsin square root of phi Ki-p/10(Ke-CwLogM-ChT-CqT2) where phi is a function that computes the probability that a random variable with a normal (0,1) distribution falls below the argument of the function; Ki is a seedlot constant, and Ke, Cw, Ch, and Cq are species constants. Regression yielded the following parameter estimates: Ki = 6.68 (95.4% initial germination), Ke = 9.08, Cw = 5.20, Ch = 0.0057 and Cq = 0.00079. Use of these parameters resulted in a fit (R2 = 0.83) comparable to that obtained by the conventional environment by environment approach (R2 = 0.80). Persistent lack of fit of deterioration curves to the normal distribution model occurred in both approaches. When probit analysis was performed by environment, specifying the initial germination of the seedlot as the natural response rate, linearity of the probits over time was significantly improved. This suggests that probit analysis of seed deterioration should be performed specifying a natural response rate (6% initially dead seeds in this case) if the initial germination is below 100%. Crop science. Mar/Apr 1989. v. 29 (2). p. 471-476. Includes references. (NAL Call No.: DNAL 64.8 C883).

0582

Proline content of the anthers and pollen of heat-tolerant and heat-sensitive cowpea subjected to different temperatures.
CRPSAY. Mutters, R.G. Ferreira, L.G.R.; Hall, A.E. Madison, Wis. : Crop Science Society of America. High temperatures cause reductions in grain yield of cowpea (Vigna unguiculata (L.) Walp. that are associated with low pollen viability and pod set. Preliminary controlled environment studies showed differences in proline accumulation in anthers and pollen of heat-tolerant and heat-sensitive genotypes under hot and optimal temperatures, but insufficient tissue was available to establish if the differences were significant. The objective was to determine whether heat injury under field conditions is associated with specific patterns of proline accumulation in leaves and reproductive tissue using heat-sensitive an heat-tolerant cowpea genotypes. Under moderate and hot temperatures, proline was the most abundant free amino acid in the anthers of both heat-sensitive and heat-tolerant cowpea genotypes. No differences in leaf proline concentrations were observed. Under hot conditions, proline levels in anthers decreased faster as pollen matured in heat-tolerant genotypes as compared with heat-sensitive genotypes. At pollen maturity, heat-sensitive genotypes contained more proline in anthers and had lower levels in pollen than the heat-tolerant genotypes under hot conditions but similar levels under more optimal temperatures. The results suggest that heat injury during floral development of sensitive cowpea genotypes may be due to inhibition of proline translocation from anther walls to pollen. Crop science. Nov/Dec 1989. v. 29 (6). p. 1497-1500. Includes references. (NAL Call No.: DNAL 64.8 C883).

0583

Pyrroline-5-Carboxylate reductase is in pea (Pisum sativum L.) leaf chloroplasts.
PLPHA. Rayapati, P.J. Stewart, C.R.; Hack, E. Rockville, Md. : American Society of Plant Physiologists. Proline accumulation is a well-known response to water deficits in leaves. The primary cause of accumulation is proline synthesis. delta 1-Pyrroline-5-carboxylate reductase (PCR) catalyzes the final reaction of proline synthesis. To determine the subcellular location of PCR, protoplasts were made from leaves of Pisum sativum L, lysed, and fractionated by differential and Percoll density gradient centrifugation. PCR activity comigrated on the gradient with the activity of the chloroplast stromal marker NADPH-dependent triose phosphate dehydrogenase. We concluded that PCR is located in chloroplasts, and therefore that chloroplasts can synthesize proline. PCR activities from chloroplasts and etiolated shoots were compared. PCR activity from both extracts is stimulated at least twofold by 100 millimolar KCl or 10 millimolar MgCl2. The pH profiles of PCR activity from both extracts reveal two separate optima at pH 6.5 and 7.5. Native isoelectric focusing gels of samples from etiolated tissue reveal a single band of PCR activity with a pI of 7.8. Plant physiology. Oct 1989. v. 91 (2). p. 581-586. ill. Includes references. (NAL Call No.: DNAL 450 P692).

0584

Rapid transient induction of phenylalanine ammonia-lyase mRNA in elicitor-treated bean cells.
PNASA. Edwards, K. Cramer, C.L.; Bolwell, G.P.; Dixon, R.A.; Schuch, W.; Lamb, C.J. Washington, D.C. : The Academy. Proceedings of the National Academy of Sciences of the United States of America. Oct 1985. v. 82 (20). p. 6731-6735. ill. Includes 44 references. (NAL Call No.: DNAL 500 N21P).

0585

Rate of water loss from detached leaves of drought resistant and susceptible genotypes of cowpea.
HJHSA. Walker, D.W. Miller, J.C. Jr. Alexandria, Va. : American Society for Horticultural Science. HortScience. Feb 1986. v. 21 (1,section 1). p. 131-132. Includes references. (NAL Call No.: DNAL SB1.H6).

0586

Reconstitution of oxidative phosphorylation and of oligomycin-sensitive ATPase by five- and six-subunit forms of pea mitochondrial F1-ATPase.
PLPHA. Horak, A. Packer, M.; Horak, H. Rockville, Md. : American Society of Plant Physiologists. Five- and six-subunit forms of F1-ATPase were purified from pea (Pisum sativum L. cv Homesteader) cotyledon submitochondrial particles. Apart from the usual complement of five subunits, the six-subunit enzyme contained an additional 26,500-dalton protein. Both forms of the F1-ATPase were used to reconstitute oxidative phosphorylation in F1-depleted (ASU) as well as in F1 and oligomycin-sensitivity conferring protein (OSCP)-depleted (ASUA) bovine mitochondrial membranes. The six-subunit enzyme was considerably more efficient in reconstituting the ATP synthesis than the five-subunit enzyme. Both forms of the enzyme were also able to reconstitute the ATPase activity in ASU- as well as in ASUA-particles. There were substantial differences, however, in the oligomycin sensitivity of the ATPase bound to the ASUA-particles: 20 and 60% inhibition by oligomycin was obtained in the case of the five-subunit and six-subunit enzyme, respectively. We conclude, that the 26,500-dalton protein present in six-subunit F1-ATPase is responsible for the increase in oligomycin sensitivity of the bound enzyme and functions, therefore, as the plant OSCP. Plant physiology. Oct 1989. v. 91 (2). p. 526-529. Includes references. (NAL Call No.: DNAL 450 P692).

0587

Regulation of ribulose-1,5-bisphosphate carboxylase activity in response to changing partial pressure of O2 and light in Phaseolus vulgaris.
PLPHA. Sharkey, T.D. Seemann, J.R.; Berry, J.A. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. July 1986. v. 81 (3). p. 788-791. Includes 30 references. (NAL Call No.: DNAL 450 P692).

0588

Regulation of ribulose-1,5-bisphosphate carboxylase activity in response to diurnal changes in irradiance.
PLPHA. Kobza, J. Seemann, J.R. Rockville, Md. : American Society of Plant Physiologists. The regulation of ribulose-1,5-bisphosphate (RuBP) carboxylase (Rubisco) activity and metabolite pool sizes in response to natural diurnal changes in photon flux density (PFD) was examined in three species (Phaseolus vulgaris, Beta vulgaris, and Spinacia oleracea) known to differ in the mechanisms used for this regulation. Diurnal regulation of Rubisco activity in P. vulgaris was primarily the result of metabolism of the naturally occurring tight-binding inhibitor of Rubisco, 2-carboxyarabinitol 1-phosphate (CA 1P). In B. vulgaris, the regulation of Rubisco activity was the result of both changes in activation state and CA 1P metabolism. In S. oleracea, Rubisco activity was regulated by a combination of changes in activation state and the binding/release of another tight binding inhibitor, probably RuBP. Despite these different mechanisms for the light regulation of Rubisco activity, the relationship between the in vivo activity of Rubisco and the PFD was the same for all three species. Rates of CA 1P metabolism were thus sufficient to allow this mechanism to participate in the diurnal regulation of Rubisco activity as PFD changed at its normal rate. Furthermore, under natural conditions this regulatory mechanism was found to be important in controlling Rubisco activity over approximately the same range of PFD as did changes in activation state of the enzyme. Finally, this regulation of Rubisco activity resulted in relatively similar and saturating RuBP pool sizes for photosynthesis at all but the lowest PFD values in all three species. Plant physiology. Mar 1989. v. 89 (3). p. 918-924. Includes references. (NAL Call No.: DNAL 450 P692).

0589

Relationship between grain yield and carbon isotope ratio (13C/12C) in dry beans.
Brick, M.A. Ehleringer, J.R.; Zacharisen, M.; Fisher, A.G. Fort Collins, Colo : Howard F. Schwartz, Colorado State University. Annual report of the Bean Improvement Cooperative. 1989. v. 32. p. 38. Includes references. (NAL Call No.: DNAL SB327.A1B5).

0590

The relationship between H2 evolution and acetylene reduction in Pisum sativum-Rhizobium leguminosarum symbioses differing in uptake hydrogenase activity.
PLPHA. Mahon, J.D. Nelson, L.M. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Sept 1986. v. 82 (1). p. 154-159. Includes 20 references. (NAL Call No.: DNAL 450 P692).

0591

Relationship of germination and vigor tests to field emergence of snap beans (Phaseolus vulgaris L.).
JSTED. Samimy, C. Taylor, A.G.; Kenny, T.J. East Lansing, Mich. : Association of Official Seed Analysts. Journal of seed technology. 1987. v. 11 (1). p. 23-34. Includes references. (NAL Call No.: DNAL SB113.2.J6).

0592

Relative effect of root and shoot genotypes on yield of common bean under drought stress.
CRPSAY. White, J.W. Castillo, J.A. Madison, Wis. : Crop Science Society of America. The inherent interactions of roots and shoots make it difficult to determine whether a characteristic such as response to drought is under control of genes expressed in roots, shoots, or throughout the plant. One approach for obtaining such information is to interchange root and shoot genotypes through grafting. In this study, plants of common bean (Phaseolus vulgaris L.) were cleft grafted and then transplanted to the field to evaluate their yield response under drought. Anticipating that the importance of root or shoot genotype would vary with genotypes evaluated, variation in rainfall patterns, and soil conditions, four yield trials with varying sets of genotypes were conducted at two sites with highly contrasting soils. At Palmira, Colombia, the soil was a fertile Mollisol (Aquic Hapludoll, pH = 7.7), and at Quilichao, Colombia, an Oxisol (Plinthic Kandiudox, pH = 5.0), where problem of low pH and high Al saturation were expected to adversely affect root growth. In all trials, root genotype had a significant and usually large effect on seed yield, while shoot genotype had no effect. No root and shoot genotype interaction occurred, and an effect of grafting was only detected in one trial. These results suggest that root characteristics are of primary importance in determining drought response of common bean and, conversely, that shoot characteristics are of much less importance. However, response of specific genotypes varies greatly with environment. Crop science. Mar/Apr 1989. v. 29 (2). p. 360-362. Includes references. (NAL Call No.: DNAL 64.8 C883).

0593

Reprogramming of protein synthesis from a developmental to a germinative mode induced by desiccation of the axes of Phaseolus vulgaris.
PLPHA. Misra, S. Bewley, J.D. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Aug 1985. v. 78 (4). p. 876-882. ill. Includes 35 references. (NAL Call No.: DNAL 450 P692).

0594

The response of beans (Phaseolus vulgaris L.) to phorate treatment under greenhouse conditions.
Barrigossi, J.A.F. Lopes, N.F.; Chandler, L. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1988. v. 31. p. 156-157. (NAL Call No.: DNAL SB327.A1B5).

0595

The response of beans (Phaseolus vulgaris L.) to phorate treatments during rainy and dry season plantings.
Barrigossi, J.A.F. Chandler, L.; Lopes, N.F. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1988. v. 31. p. 157-158. (NAL Call No.: DNAL SB327.A1B5).

0596

Response of two pea hybrids to CO2 enrichment: a test of the energy overflow hypothesis for alternative respiration.
PNASA. Musgrave, M.E. Strain, B.R.; Siedow, J.N. Washington, D.C. : The Academy. Proceedings of the National Academy of Sciences of the United States of America. Nov 1986. v. 83 (21). p. 8157-8161. ill. Includes references. (NAL Call No.: DNAL 500 N21P).

0597

Reversal of chlorsulfuron-induced inhibition of mitotic entry by isoleucine and valine.
PLPHA. Rost, T.L. Reynolds, T. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Feb 1985. v. 77 (2). p. 481-482. ill. Includes 11 references. (NAL Call No.: DNAL 450 P692).

0598

Rhizosphere acidification as a response to iron deficiency in bean plants.
PLPHA. Vos, C.R. de. Lubberding, H.J.; Bienfait, H.F. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. July 1986. v. 81 (3). p. 842-846. Includes 32 references. (NAL Call No.: DNAL 450 P692).

0599

Rhizosphere acidification by iron deficient bean plants: the role of trace amounts of divalent metal ions. A study on roots of intact plants with the use of 11C- and 31P-NMR.
PLPHA. Bienfait, H.F. Lubberding, H.J.; Heutink, P.; Lindner, L.; Visser, J.; Kaptein, R.; Dijkstra, K. Rockville, Md. : American

Society of Plant Physiologists. Rhizosphere acidification by Fe-deficient bean (Phaseolus vulgaris L.) plants was induced by trace amounts of divalent metal ions (Zn, Mn). The induction of this Fe-efficiency reaction was studied by 14CO2 and 11CO2 fixation experiments, and with 31P-NMR on roots of whole plants. The starting and ending of an acidification cycle was closely coupled to parallel changes in CO2 fixation, within the maximal resolution capacity of 20 min. 31P-NMR experiments on intact root systems showed one peak which was ascribed to vacuolar free phosphate. At the onset of proton extrusion this peak shifted, indicating increase of pH in the cells. Proton extrusion was inhibited, with a lag period of 2 hours, by the protein synthesis inhibitors cycloheximide and hygromycin. It is assumed that Zn and Mn induce proton extrusion in Fe-deficient bean roots by activating the synthesis of a short-living polypeptide; the NMR data suggest a role for this peptide in the functioning of a proton pumping ATPase in the plasma membrane. Plant physiology. May 1989. v. 90 (1). p. 359-364. Includes references. (NAL Call No.: DNAL 450 P692).

0600

Role of oxygenases in pisatin biosynthesis and in the fungal degradation of maackiain.
PLPHA. Matthews, D.E. Weiner, E.J.; Matthews, P.S.; VanEtten, H.D. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Feb 1987. v. 83 (2). p. 365-370. Includes references. (NAL Call No.: DNAL 450 P692).

0601

Rooting cofactor activity of plant phytoalexins.
PLPHA. Yoshikawa, M. Gemma, H.; Sobajima, Y.; Masago, H. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Nov 1986. v. 82 (3). p. 864-866. ill. Includes references. (NAL Call No.: DNAL 450 P692).

0602

Rooting of intact mung bean hypocotyls stimulated by auxin, ACC, and low temperature.
HJHSA. Jusaitis, M. Alexandria, Va. : American Society for Horticultural Science. HortScience. Aug 1986. v. 21 (4). p. 1024-1025. ill. Includes references. (NAL Call No.: DNAL SB1.H6).

0603

Salicylic acid inhibition of ethylene production by apple discs and other plant tissues.
JPGRDI. Romani, R.J. Hess, B.M.; Leslie, C.A. New York, N.Y. : Springer. Journal of plant growth regulation. 1989. v. 8 (1). p. 63-69. Includes references. (NAL Call No.: DNAL QK745.J6).

0604

Salinity and nitrogen effects on photosynthesis, ribulose-1,5-bisphosphate carboxylase and metabolite pool sizes in Phaseolus vulgaris L.
PLPHA. Seeman, J.R. Sharkey, T.D. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Oct 1986. v. 82 (2). p. 555-560. Includes references. (NAL Call No.: DNAL 450 P692).

0605

Salinity effects on photosynthesis in isolated mesophyll cells of cowpea leaves.
PLPHA. Plaut, Z. Grieve, C.M.; Federman, E. Rockville, Md. : American Society of Plant Physiologists. Mesophyll cells from leaves of cowpea (Vigna unquiculata L. Walp.) plants grown under saline conditions were isolated and used for the determination of photosynthetic CO2 fixation. Maximal CO2 fixation rate was obtained when the osmotic potential of both cell isolation and CO2 fixation assay media were close to leaf osmotic potential, yielding a zero turgor pressure. Hypotonic and hypertonic media decreased the rate of photosynthesis regardless of the salinity level during plant growth. No decrease in photosynthesis was obtained for NaCl concentrations up to 87 moles per cubic meter in the plant growing media and only a 30% decrease was found at 130 moles per cubic meter when the osmotic potential of cell isolation and CO2 fixation media were optimal. The inhibition was reversible when stress was relieved. At 173 moles per cubic meter NaCl, photosynthesis was severely and irreversibly inhibited. This inhibiton was attributed to toxic effects caused by high Cl- and Na+ accumulation in the leaves. Uptake of sorbitol by intact cells was insignificant, and therefore not associated with cell volume changes. The light response curve of cells from low salinity grown plants was similar to the controls. Cells from plants grown at 173 moles per cunbic meter NaCl were light saturated at a lower radiant flux density than were cells from lower salinity levels. Plant physiology. Oct 1989. v. 91 (2). p. 493-499. Includes references. (NAL Call No.: DNAL 450 P692).

0606

Salinity stress inhibits bean leaf expansion by reducing turgor, not wall extensibility.
PLPHA. Neumann, P.M. Van Volkenburgh, E.; Cleland, R.E. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Sept 1988. v. 88 (1). p. 233-237. Includes references. (NAL Call No.: DNAL 450 P692).

0607

Salinity tolerance of winged bean as compared to that of soybean.
AGJOAT. Weil, R.R. Khalil, N.A. Madison, Wis. : American Society of Agronomy. Agronomy journal. Jan/Feb 1986. v. 78 (1). p. 67-70. Includes 16 references. (NAL Call No.: DNAL 4 AM34P).

0608

Salt increases the water use efficiency in water stressed plants.
CRPSAY. McCree, K.J. Richardson, S.G. Madison, Wis. : Crop Science Society of America. Crop science. May/June 1987. v. 27 (3). p. 543-547. Includes references. (NAL Call No.: DNAL 64.8 C883).

0609

Salt tolerance--does leaf respiration have a contribution to make?.
Brown, S. Day, D.A.; Critchley, C. New York : Plenum Press, c1987. Plant mitochondria : structural, functional, and physiological aspects / edited by A.L. Moore and R.B. Beechey. p. 393-396. Includes references. (NAL Call No.: DNAL QK725.P63).

0610

Seed and pod set of red kidney beans.
JOSHB. Pechan, P.M. Webster, B.D. Alexandria, Va. : The Society. Journal of the American Society for Horticultural Science. Jan 1986. v. 111 (1). p. 87-89. ill. Includes 14 references. (NAL Call No.: DNAL 81 SO12).

0611

Seedling test for the quantitative measurement of root tolerances to compacted soil.
CRPSAY. Asady, G.H. Smucker, A.J.M.; Adams, M.W. Madison, Wis. : Crop Science Society of America. Crop science. Sept/Oct 1985. v. 25 (5). p. 802-806. Includes references. (NAL Call No.: DNAL 64.8 C883).

0612

Selection and inheritance of heat tolerance in the common bean by use of conductivity.
JOSHB. Marsh, L.E. Davis, D.W.; Li, P.H. Alexandria, Va. : The Society. Journal of the American Society for Horticultural Science. Sept 1985. v. 110 (5). p. 680-683. Includes references. (NAL Call No.: DNAL 81 SO12).

0613

Sodium stimulation of uptake hydrogenase activity in symbiotic Rhizobium.
PLPHA. Kapulnik, Y. Phillips, D.A. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Oct 1986. v. 82 (2). p. 494-498. Includes references. (NAL Call No.: DNAL 450 P692).

0614

Soil compaction reduces nodulation, nodule efficiency, and growth of soybean and white bean.
HJHSA. Tu, J.C. Buttery, B.R. Alexandria, Va. : American Society for Horticultural Science. HortScience. Aug 1988. v. 23 (4). p. 722-724. Includes references. (NAL Call No.: DNAL SB1.H6).

0615

Soil fertility effects on growth, nitrogen fixation, nodule enzyme activity and xylem exudates of Lablab purpureus (L.) Sweet, grown on a Typic Eutrustox.
CSOSA2. Purcino, A.A.C. Lynd, J.Q. New York, N.Y. : Marcel Dekker. Communications in soil science and plant analysis. 1986. v. 17 (12). p. 1331-1354. ill. Includes references. (NAL Call No.: DNAL S590.C63).

0616

Solar tracking: light avoidance induced by water stress in leaves of kidney bean seedlings in the field.
CRPSAY. Berg, V.S. Hsiao, T.C. Madison, Wis. : Crop Science Society of America. Crop science. Sept/Oct 1986. v. 26 (5). p. 980-986. Includes references. (NAL Call No.: DNAL 64.8 C883).

0617

Solution effects on the thermostability of bean chloroplast thylakoids.
CRPSAY. Al-Khatib, K. Wiest, S.C. Madison, Wis. : Crop Science Society of America. Knowledge of the physicochemical nature of the strains imposed by heat stress on biological membranes requires a definition of other stresses that impose similar strains. To that end, this paper defines several solution properties that alter

the effects of heat on isolated chloroplast thylakoid membranes. Isolated bean (Phaseolus vulgaris L.) 'Oregon 1604' thylakoids in various milieus were exposed to 25 or 45 degrees C, and the repercussion(s) of heat were determined. Raffinose (0.4-0.5 M) was slightly more thermostabilizing than 2 M sucrose as evidenced by an amelioration of the: (i) heat-induced decline in electron transport, (ii) heat-induced alteration in the susceptibility of thylakoid polypeptides to trypsin digestion, and (iii) heat-induced decline in the maximum fluorescence transient measured at 685 nm. Equimolar glucose + fructose appeared to be equivalent in effectivness to sucrose. Solutions with a pH of 5.5 or below and 7.0 or above appeared to increase the susceptibility of thylakoid electron transport to heat. Thermoprotection of electron transport to heat was afforded by aspartate at pH 6 and glutamate at pH 7. Dimethylsulfoxide and ethylene glycol appeared to provide some thermostability at concentrations tested (1 M and 100 mL/L, respectively). Urea appeared to mimic heat-induced injury. Exposure of thylakoids to 45 degrees C for 2 min appeared to cause the same degree of impairment as ca. 0.8 M ureas, while exposure for 4 min appeared to cause the same as ca. 0.9 M urea. Finally, low concentrations (0.05-0.1 M) of mercaptoethanol appeared to exacerbate heat-induced thylakoid malfunction. Crop science. Jan/Feb 1990. v. 30 (1). p. 90-96. Includes references. (NAL Call No.: DNAL 64.8 C883).

0618

Source-sink relationship in a climbing pole bean (Phaseolus vulgaris L.): its effect on yield.
Madrid Cruz, M. Kohashi-Shibata, J. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1988. v. 31. p. 174-175. (NAL Call No.: DNAL SB327.A1B5).

0619

Source-sink relationships in an indeterminate bush bean (Phaseolus vulgaris L.).
Martinez-Villegas, E. Kohashi-Shibata, J. Fort Collins, Colo : Howard F. Schwartz, Colorado State University. Annual report of the Bean Improvement Cooperative. 1989. v. 32. p. 31. (NAL Call No.: DNAL SB327.A1B5).

0620

Specific localization of a plant cell wall glycine-rich protein in protoxylem cells of the vascular system.
PNASA. Keller, B. Templeton, M.D.; Lamb, C.J. Washington, D.C. : The Academy. Proceedings of the National Academy of Sciences of the United States of America. Mar 1989. v. 86 (5). p. 1529-1533. ill. Includes references. (NAL Call No.: DNAL 500 N21P).

0621

Spectral reflectance relationships to leaf water stress.
PERSD. Ripple, W.J. Falls Church, Va. : American Society of Photogrammetry and Remote Sensing. Photogrammetric engineering and remote sensing. Oct 1986. v. 52 (10). p. 1669-1675. Includes references. (NAL Call No.: DNAL 325.28 P56).

0622

Starch and sucrose synthesis in Phaseolus vulgaris as affected by light, CO2, and abscisic acid.
PLPHA. Sharkey, T.D. Berry, J.A.; Raschke, K. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Mar 1985. v. 77 (3). p. 617-620. Includes 20 references. (NAL Call No.: DNAL 450 P692).

0623

Stimulation of ethylene production in bean leaf discs by the pseudomonad phytotoxin coronatine.
PLPHA. Ferguson, I.B. Mitchell, R.E. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Apr 1985. v. 77 (4). p. 969-973. Includes 28 references. (NAL Call No.: DNAL 450 P692).

0624

Stomatal closure vs. osmotic adjustment: a comparison of stress responses.
CRPSAY. McCree, K.J. Richardson, S.G. Madison, Wis. : Crop Science Society of America. Crop science. May/June 1987. v. 27 (3). p. 539-543. Includes references. (NAL Call No.: DNAL 64.8 C883).

0625

Stromal phosphate concentration is low during feedback limited photosynthesis.
PLPHA. Sharkey, T.D. Vanderveer, P.J. Rockville, Md. : American Society of Plant Physiologists. It has been hypothesized that photosynthesis can be feedback limited whtn the phosphate concentration cannot be both low enough to allow starch and sucrose synthesis at the required rate and high enough for ATP synthesis at the required rate. We have measured the concentration of phosphate in the stroma and cytosol of leaves held under feedback conditions. We used nonaqueous fractionation techniques with freeze-clamped leaves of Phaseolus vulgaris plants grown on reduced phosphate nutrition. Feedback was induced by holding leaves in low O2 or high CO2 partial pressure. We found 7 millimolar phosphate in the stroma of leaves in normal oxygen but just 2.7 millimolar phosphate in leaves held in low oxygen. Because 1 to 2 millimolar phosphate in the stroma may be

metabolically inactive, we estimate that in low oxygen, the metabolically active pool of phosphate is between negligible and 1.7 millimolar. We conclude that halfway between these extremes, 0.85 millimolar is a good estimate of the phosphate concentration in the stroma of feedback-limited leaves and that the true concentration could be even lower. The stromal phosphate concentration was also low when leaves were held in high CO2, which also induces feedback-limited photosynthesis, indicating that the effect is related to feedback limitation, not to low oxygen per se. We conclude that the concentration of phosphate in the stroma is usually in excess and that it is sequestered to regulate photosynthesis, especially starch synthesis. The capacity for this regulation is limited by the coupling factor requirement for phosphate. Plant physiology. Oct 1989. v. 91 (2). p. 679-684. Includes references. (NAL Call No.: DNAL 450 P692).

0626

Structural and photosynthetic compensation for leafminer (Diptera: Agromyzidae) injury in lima beans.
EVETEX. Martens, B. Trumble, J.T. Lanham, Md. : Entomological Society of America. Palisade mesophyll tissue removed from mature leaves of Phaseolus lunatus L. by the leafmining herbivore Liriomyza trifolii (Burgess) was replaced with photosynthetically active cells, permitting virtually complete recovery from injury. No significant differences in biomass production or levels of ribulose-1,5-bisphosphate carboxylase were observed between damaged and control plants. Decreases in photosynthesis did not exceed 10% for leaves with approximately one-fourth of the leaf area mined. Development of other, photosynthetically inactive callus cells along vascular bundles and frass deposits served to compartmentalize leafmines, generating a suitable microclimate for regeneration of cells as well as preventing intrusion of disease inoculum and arthropod pests. Such cellular regrowth not only benefits the host, but provides substantial advantages for facultatively cannibalistic larvae that are incapable of relocating to undamaged leaves. Environmental entomology. Apr 1987. v. 16 (2). p. 374-378. ill. Includes references. (NAL Call No.: DNAL QL461.E532).

0627

Structure and stereochemistry of phaseolinic acid: a new acid from Macrophomina phaseolina.
JNPRDF. Mahato, S.B. Siddiqui, K.A.I.; Bhattacharya, G.; Ghosal, T.; Miyahara, K.; Sholichin, M.; Kawasaki, T. Pittsburgh, Pa. : American Society of Pharmacognosy and the Lloyd Library and Museum. Journal of natural products. Mar/Apr 1987. v. 50 (2). p. 245-247. Includes references. (NAL Call No.: DNAL 442.8 L77).

0628

Sugars and desiccation tolerance in seeds.
PLPHA. Koster, K.L. Leopold, A.C. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Nov 1988. v. 88 (3). p. 829-832. Includes references. (NAL Call No.: DNAL 450 P692).

0629

Synthesis of mitogenic phytohemagglutinin-L in Escherichia coli.
Hoffman, L.M. Donaldson, D.D. New York, N.Y. : Nature Pub. Co. Bio/technology. Feb 1987. v. 5 (2). p. 157-160. ill. Includes references. (NAL Call No.: DNAL QH442.B5).

0630

Synthesis of only two heat shock proteins is required for thermoadaptation in cultured cowpea cells.
PLPHA. Heuss-LaRosa, K. Mayer, R.R.; Cherry, J.H. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Sept 1987. v. 85 (1). p. 4-7. ill. Includes references. (NAL Call No.: DNAL 450 P692).

0631

Thermal properties of pigeon pea.
CFWOD. Shepherd, H. Bhardwaj, R.K. St. Paul, Minn. : American Association of Cereal Chemists. Cereal foods world. July 1986. p. 466-470. Includes 31 references. (NAL Call No.: DNAL 59.8 C333).

0632

Tissue and cellular distribution of glutamine synthetase in roots of pea (Pisum sativum) seedlings.
PLPHA. Vezina, L.P. Langlois, J.R. Rockville, Md. : American Society of Plant Physiologists. The effect of nitrate application on glutamine synthetase activity in roots of pea (Pisum sativum L.) seedlings (2 weeks old) was studied. Separation of organelles from root fragments by sucrose density-gradient centrifugation revealed that both nitrite reductase and glutamine synthetase activities increasedin root plastids as a response to nitrate application and that no such response was induced by ammonium application. Glutamine synthetase activity was also found to increase in plastids with distance from apex in nitrate-treated plants, the highest specific activity being located in the fourth 1-centimeter segment. Separation by SDS-PAGE and characterization by Western blotting showed that cytosolic glutamine synthetase contains one subunit polypeptide (28 kilodaltons) and that plastid glutamine synthetase contains both the 38-kilodalton subunit and a heavier subunit. When nitrate was present in the

nutrient solution, the heavier subunit increased in abundance in protein fractions obtained from purified root plastids. Plant physiology. July 1989. v. 90 (3). p. 1129-1133. ill. Includes references. (NAL Call No.: DNAL 450 P692).

0633

Transcriptional and posttranscriptional control of phaseolin and phytohemagglutinin gene expression in developing cotyledons of Phaseolus vulgaris.
PLPHA. Chappell, J. Chrispeels, M.J. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. May 1986. v. 81 (1). p. 50-54. Includes 23 references. (NAL Call No.: DNAL 450 P692).

0634

Tridiphane 2-(3,5-dichlorophenyl)-2-(2,2,2-trichloroethyl)oxirane an atrazine synergist: enzymatic conversion to a potent glutathione S-transferase inhibitor.
PCBPB. Lamoureux, G.L. Rusness, D.G. Duluth, Minn. : Academic Press. Pesticide biochemistry and physiology. Dec 1986. v. 26 (3). p. 323-342. Includes 40 references. (NAL Call No.: DNAL SB951.P49).

0635

Uniconazole reduces ethylene and 1-aminocyclopropane-1-carboxylic acid and increases spermine levels in mung bean seedlings.
JPGRDI. Hofstra, G. Krieg, L.C.; Fletcher, R.A. New York, N.Y. : Springer. Journal of plant growth regulation. 1989. v. 8 (1). p. 45-51. Includes references. (NAL Call No.: DNAL QK745.J6).

0636

Uptake, translocation and metabolism of anthracene in bush bean (Phaseolus vulgaris L.).
ETOCDK. Edwards, N.T. Elmsford : Pergamon Press. Environmental toxicology and chemistry. 1986. v. 5 (7). p. 659-665. Includes 13 references. (NAL Call No.: DNAL QH545.A1E58).

0637

VA mycorrhizal inoculation increases growth and phosphorus uptake of cluster beans.
Surender, N. Babu, R.S.H.; Krishna, K.R.; Singh, B.G. Corvallis, Or. : Oregon State University , Forest Research Laboratory, 1985. Proceedings of the 6th North American Conference on Mycorrhizae : June 25-29, 1984, Bend, Oregon / compiled and edited by Randy Molina ; sponsoring institutions, Oregon State University, College of Forestry, and USDA. p. 405. Includes references. (NAL Call No.: DNAL aQK604.N6 1984).

0638

Water stress reduces ozone injury via a stomatal mechanism.
PLPHA. Tingey, D.T. Hogsett, W.E. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Apr 1985. v. 77 (4). p. 944-947. Includes 24 references. (NAL Call No.: DNAL 450 P692).

0639

Water use by legumes and its effect on soil water status.
CRPSAY. Badaruddin, M. Meyer, D.W. Madison, Wis. : Crop Science Society of America. To make informed decisions on whether to include legumes in cropping systems, information is needed on water use by legumes and its effect on soil water availability to subsequent crops. The objectives of this study were to determine the water use, water use efficiency (WUE), and soil water depletion pattern of four grain legumes and three green-manure or forage legumes. Field studies were conducted on a Fargo silty clay (fine, montmorillonitic, frigid Vertic Haplaquoll) at Fargo and on a Perella-Bearden silty clay loam (fine-silty, mixed, frigid Typic Haplaquoll; fine-silty, frigid Aeric Calciaquoll) at Prosper, ND in 1986 and 1987. Soil water to a depth of 2.2 m was determined by the neutron attenuation method at 15-d intervals. Legume crops used 10 to 25% more seasonal water than wheat (Triticum aestivum L.) across environments, but WUE (kg dry matter ha-1 mm-1 of water) of legumes was 0 to 25% greater than that of wheat. Green-manure and forage legumes generally had greater water use and WUE than grain legumes, and this was associated with their longer growing season and higher dry matter production. Cumulative water depletion during June to September by green-manure, forage, and grain legumes was 70, 63, and 43 mm greater, respectively, than that of a fallow check, and was not significantly different from that of wheat in two of four environments. However, an increase in soil water content occurred at the 0- to 0.3-m soil depth for all treatments in the following spring across three environments. Soil water content in the spring following a legume was not significantly different from that following wheat and was only about 30 mm greater than that of fallow across environments. These results indicate that growing some legumes in cropping systems may not substantially affect the soil water content compared to continuous cereal cropping or to fallow. Crop science. Sept/Oct 1989. v. 29 (5). p. 1212-1216. Includes references. (NAL Call No.: DNAL 64.8 C883).

0640

Xanthophylls and abscisic acid biosynthesis in water-stressed bean leaves.
PLPHA. Li, Y. Walton, D.C. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Dec 1987. v. 85 (4). p. 910-915. Includes references. (NAL Call No.: DNAL 450 P692).

0641

XE-1019: plant response, translocation, and metabolism.
JPGRDI. Sterrett, J.P. New York, N.Y. : Springer. Journal of plant growth regulation. 1988. v. 7 (1). p. 19-26. ill. Includes references. (NAL Call No.: DNAL QK745.J6).

0642

Zinc and phytate distribution in peas. Influence of heat treatment, germination, pH, substrate, and phosphorus on pea phytate and phytase.
JFDAZ. Beal, L. Mehta, T. Chicago, Ill. : Institute of Food Technologists. Journal of food science. Jan/Feb 1985. v. 50 (1). p. 96-100, 115. Includes references. (NAL Call No.: DNAL 389.8 F7322).

0643

4-Amino-5-hexynoic acid--a potent inhibitor of tetrapyrrole biosynthesis in plants.
PLPHA. Elich, T.D. Lagarias, J.C. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Nov 1988. v. 88 (3). p. 747-751. Includes references. (NAL Call No.: DNAL 450 P692).

0644

5,6-dichloroindole-3-acetic acid as a potent auxin and 5,7-dichloroindole-3-isobutyric acid as potent anti-auxin: their synthesis and biological activities.
PPGGD. Hatano, T. Katayama, M.; Marumo, S. Lake Alfred, Fla. : The Society. Proceedings annual meeting - Plant Growth Regulator Society of America. 1987. (14th). p. 353-358. Includes references. (NAL Call No.: DNAL SB128.P5).

0645

Ag facts: Dry bean diseases.
MUCBA. Hart, L.P. Saettler, A.W.; Clayton, J.L. East Lansing, Mich. : The Service. Extension bulletin E - Cooperative Extension Service, Michigan State University. June 1986. (1977). 4 p. Includes references. (NAL Call No.: DNAL 275.29 M58B).

0646

Beneficial bugs /Natural Food Institute.
Dudley, Mass. : The Institute, 1986? . Cover title.~ "Where to buy natural predators that destroy aphids, cabbage worms, grasshoppers, bean beetles, gypsy moths, Japanese beetles, flies, mites, corn borers, and other pests.". 10, 1 p. ; 22 cm. (NAL Call No.: DNAL SF518.B4).

0647

Cowpea history, production, and research in Mississippi.
TAEMA. Hare, W.W. College Station, Tex. : The Station. Miscellaneous publication MP - Texas Agricultural Experiment Station. In the series analytic: Cowpea production and research--historical and current perspectives edited by J. Creighton Miller, Jr. Proceedings of a Workshop, held February 5, 1979, New Orleans, Louisiana. Feb 1988. (1639). p. 16-18. (NAL Call No.: DNAL 100 T31M).

0648

Deleterious effects of white seed due to p gene in beans.
JOSHB. Dickson, M.H. Petzoldt, R. Alexandria, Va. : The Society. Journal of the American Society for Horticultural Science. Jan 1988. v. 113 (1). p. 111-114. Includes references. (NAL Call No.: DNAL 81 S012).

0649

Deposition and effectiveness of charged sprays for pest control.
TAAEA. Franz, E. Reichard, D.L.; Carpenter, T.G.; Brazee, R.D. St. Joseph, Mich. : The Society. Transactions of the ASAE - American Society of Agricultural Engineers. Jan/Feb 1987. v. 30 (1). p. 50-55. ill. Includes references. (NAL Call No.: DNAL 290.9 AM32T).

0650

Functional implications of the subcellular localization of ethylene-induced chitinase and beta-1,3-glucanase in bean leaves.
Mauch, F. Staehelin, L.A. Rockville, Md. : American Society of Plant Physiologists. The Plant cell. Apr 1989. v. 1 (4). p. 447-457. ill. Includes references. (NAL Call No.: DNAL QK725.P532).

0651

Growing lima beans.
Turner, J. Strother, G.; Gazaway, W.S.; Patterson, M. Auburn, Ala. : The Service. Circular ANR - Cooperative Extension Service, Auburn University. In subseries: Horticulture. Mar 1988. (215). 4 p. (NAL Call No.: DNAL S544.3.A2C47).

0652

Growing lima beans.
Williams, J.L. Strother, G.; Gazaway, W.S., Patterson, M. Auburn, Ala. : The Service. Circular ANR - Cooperative Extension Service, Auburn University. Dec 1986. (215). 4 p. (NAL Call No.: DNAL S544.3.A2C47).

0653

Integrated pest management research for pea production.
OASPA. Wilkins, D.E. Baarstad, L.L.; Kraft, J.M. Corvallis, Or. : The Station. Special report - Oregon State University, Agricultural Experiment Station. June 1985. (738). p. 50-54. maps. (NAL Call No.: DNAL 100 OR3M).

0654

Mississippi Pinkeye--a new protepea.
RRMSD. Hare, W.W. Thompson, P.G. Mississippi State, Miss. : The Station. Research report - Mississippi Agricultural and Forestry Experiment Station. Nov 1988. v. 13 (11). 4 p. ill. (NAL Call No.: DNAL S79.E37).

0655

Performance of dry beans grown on the coastal plains of Puerto Rico.
JAUPA. Beaver, J.S. Badillo-Feliciano, J.; Reyes-Soto, I. Mayaguez : University of Puerto Rico, Agricultural Experiment Station. The Journal of agriculture of the University of Puerto Rico. Apr 1985. v. 69 (2). p. 125-133. Includes references. (NAL Call No.: DNAL 8 P832J).

0656

Pest problems of field beans in the United States.
Schwartz, H.F. St. Paul, Minn. : Center for Alternative Crops and Products, University of Minnesota, 1987? . Grain legumes as alternative crops : a symposium / sponsored by the Center for Alternative Crops and Products,

University of Minnesota, July 23-24, 1987. p. 125-131. Includes references. (NAL Call No.: DNAL SB317.L43G73).

0657

Production, insect and weed considerations with dry peas, lentils, chickpeas and faba beans. Muehlbauer, F.J. St. Paul, Minn. : Center for Alternative Crops and Products, University of Minnesota, 1987? . Grain legumes as alternative crops : a symposium / sponsored by the Center for Alternative Crops and Products, University of Minnesota, July 23-24, 1987. p. 133-150. ill. Includes references. (NAL Call No.: DNAL SB317.L43G73).

0658

Aggressiveness of Conidiobolus obscurus against the pea aphid. IV. Electrophoretic and immunoelectrophoretic characterization of aggressive strains.
JIVPA. Latge, J.P. Sampedro Rosas, L.; Boucias, D.G. Duluth, Minn. : Academic Press. Journal of invertebrate pathology. Sept 1986. v. 48 (2). p. 159-166. ill. Includes references. (NAL Call No.: DNAL 421 J826).

0659

Antibiosis effects of wild dry bean accessions on the Mexican bean weevil and the bean weevil (Coleoptera: Bruchidae).
JEENAI. Cardona, C. Posso, C.E.; Kornegay, J.; Valor, J.; Serrano, M. Lanham, Md. : Entomological Society of America. High levels of antibiosis resistance to the Mexican bean weevil (MBW), Zabrotes subfasciatus (Boheman), and the bean weevil (BW), Acanthoscelides obtectus (Say), in wild dry bean, Phaseolus vulgaris L., accessions were caused primarily by high mortality of late first instars and, to a lesser extent, by high mortality of early second instars, coupled with a significant prolongation of the duration of the first instar. Antibiosis had a significant effect on the fecundity of F1 females reared on resistant varieties. Seed integument did not appear to act as a barrier for larvae of the bean weevil. Rearing of both insects on "artificial" seeds further demonstrated that factors responsible for resistance are present in the cotyledons. Journal of economic entomology. Feb 1989. v. 82 (1). p. 310-315. Includes references. (NAL Call No.: DNAL 421 J822).

0660

Aphid management in alfalfal for Wyoming.
WAEBA. Gholson, L.E. Laramie : The Station. Bulletin B - Wyoming, Agricultural Experiment Station. In subseries: Integrated Pest Management. Sept 1986. (866). 2 p. ill. Includes references. (NAL Call No.: DNAL 100 W99 (1)).

0661

An approach to control of bean golden mosaic virus in dry beans (Phaseolus vulgaris L.).
Sartorato, A. Seijas, C.A.R. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. Mar 1985. v. 28. p. 26-27. (NAL Call No.: DNAL SB327.A1B5).

0662

Bean foliage consumption by Mexican bean beetle (Coleoptera: Coccinellidae) and its effect on yield.
JKESA. Kabissa, J. Fronk, W.D. Lawrence, Kan. : The Society. Journal of the Kansas Entomological Society. Apr 1986. v. 59 (2). p. 275-279. Includes references. (NAL Call No.: DNAL 420 K13).

0663

Bean-leaf beetle.
Ghidiu, G.M. New Brunswick, N.J. : The Service. FS - Cooperative Extension Service, Cook College. 1987. (241). 2 p. ill. (NAL Call No.: DNAL S544.3.N5F7).

0664

Bean seeds treated with furadan 300 to control cutworms.
Gallardo, J. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1988. v. 31. p. 115-116. Includes references. (NAL Call No.: DNAL SB327.A1B5).

0665

Bean weevil.
Ghidiu, G.M. New Brunswick, N.J. : The Service. FS - Cooperative Extension Service, Cook College. 1987. (249). 2 p. ill. (NAL Call No.: DNAL S544.3.N5F7).

0666

Bean yellow mosaic virus isolate that infects peanut (Arachis hypogaea).
PLDRA. Bays, D.C. Demski, J.W. St. Paul, Minn. : American Phytopathological Society. Plant disease. July 1986. v. 70 (7). p. 667-669. ill. Includes 14 references. (NAL Call No.: DNAL 1.9 P69P).

0667

Beneficial arthropod behavior mediated by airborne semiochemicals. V Influence of rearing methods, host plant, and adult experience on host-searching behavior of Microplitis croceipes (Cresson), a larval parasitoid of Heliothis.
JCECD. Drost, Y.C. Lewis, W.J.; Tumlinson, J.H. New York, N.Y. : Plenum Press. Journal of chemical ecology. July 1988. v. 14 (7). p. 1607-1616. Includes references. (NAL Call No.: DNAL QD415.A1J6).

0668

Beneficial arthropod behavior mediated by airborne semiochemicals. III. Influence of age and experience on flight chamber responses of Microplitis demolitor Wilkinson.
JCECD. Herard, F. Keller, M.A.; Lewis, W.J.; Tumlinson, J.H. New York, N.Y. : Plenum Press. Journal of chemical ecology. July 1988. v. 14 (7). p. 1583-1596. Includes references. (NAL Call No.: DNAL QD415.A1J6).

0669

Beneficial arthropod behavior medicated by airborne semiochemicals. IV. Influence of host diet on host-oriented flight chamber responses of Microplitis demolitor Wilkinson.
JCECD. Herard, F. Keller, M.A.; Lewis, W.J.; Tumlinson, J.H. New York, N.Y. : Plenum Press. Journal of chemical ecology. July 1988. v. 14 (7). p. 1597-1606. Includes references. (NAL Call No.: DNAL QD415.A1J6).

0670

Bionomics of the bean seed maggot, Delia florilega (Diptera: Anthomyiidae), under controlled conditions.
EVETEX. Kim, T.H. Eckenrode, C.J. College Park, Md. : Entomological Society of America. Environmental entomology. Aug 1987. v. 16 (4). p. 881-886. Includes references. (NAL Call No.: DNAL QL461.E532).

0671

Chemical control of the lesser cornstalk borer infesting beans.
Loera Gallardol, J. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1988. v. 31. p. 113-114. Includes references. (NAL Call No.: DNAL SB327.A1B5).

0672

Combination of insecticide applications with trap crops of early maturing soybean and southern peas for population management of Nezara viridula in soybean (Hemiptera: Pentatomidae).
JESCEP. Todd, J.W. Schumann, F.W. Tifton, Ga. : The Entomological Science Society. Journal of Entomological Science. Apr 1988. v. 23 (2). p. 192-199. Includes references. (NAL Call No.: DNAL QL461.G4).

0673

Combinations of sethoxydim (Poast) herbicide with insecticides and a fungicide for snap beans.
Mullins, C.A. Shamiyeh, N.B. Fort Collins, Colo : Howard F. Schwartz, Colorado State University. Annual report of the Bean Improvement Cooperative. 1989. v. 32. p. 83. (NAL Call No.: DNAL SB327.A1B5).

0674

Commercial lima bean production.
Binning, L.K. Wyman, J.A.; Bundy, L.G.; Stevenson, W.R. Madison, Wis. : The Programs. Publication - Cooperative Extension Programs. University of Wisconsin - Extension. Jan 1985. (A2338). 4 p. (NAL Call No.: DNAL S544.3.W6W53).

0675

Comparative effects of Nosema epilachnae and Nosema varivestis on the Mexican bean beetle, Epilachna varivestis.
JIVPA. Brooks, W.M. Duluth, Minn. : Academic Press. Journal of invertebrate pathology. Nov 1986. v. 48 (3). p. 344-354. Includes references. (NAL Call No.: DNAL 421 J826).

0676

Comparative rotenone toxicity in the predator, Amblyseius fallacis (Acari: Phytoseidae), and the herbivore, Tetranychus urticae (Acari: Tetranychidae), grown on lima beans and cucumbers.
EVETEX. Strickler, K. Croft, B.A. College Park, Md. : Entomological Society of America. Environmental entomology. June 1985. v. 14 (3). p. 243-246. ill. Includes references. (NAL Call No.: DNAL QL461.E532).

0677

Comparison of feeding behavior of the potato leafhopper Empoasca fabae (Homoptera: Cicadellidae) on alfalfa and broad bean leaves.
EVETEX. Backus, E.A. Hunter, W.B. Lanham, Md. : Entomological Society of America. A quantitative comparison was made of the feeding behavior of the potato leafhopper, Empoasca fabae (Harris), on the leaves of two host plants, alfalfa (Medicago sativa L.) and broad bean (Vicia faba L.), using an AC electronic feeding monitor. Results showed significant differences in feeding between the two hosts, primarily because of the variable occurrence of still-stylet ingestion, a behavior (correlated with the Ic waveform) that may indicated ingestion of phloem sap. The similarities between the hosts were due to the dominance of the lacerate-and-flush feeding style in mesophyll and perhaps some phloem tissues, represented by the Ia waveform. Differences in

feeding between hosts probably contribute to the wide host range of this species, as well as the differences in feeding injury on these two crop plants. Environmental entomology. June 1989. v. 18 (3). p. 473-480. Includes references. (NAL Call No.: DNAL QL461.E532).

0678

Comparison of sweep net, D-vac, and absolute sampling, and diel variation of sweep net sampling estimates in lentils for pea aphid (Homoptera: Aphididae), nabids (Hemiptera: Nabidae), lady beetles (Coleoptera: Coccinellidae), and lacewings (Neuroptera: Chrysopidae).
JEENAI. Schotzko, D.J. O'Keeffe, L.E. Lanham, Md. : Entomological Society of America. Relative accuracy of sweep net sampling was compared with D-vac (D-vac, Riverside, Calif.) and absolute sampling methods for determining population densities of pea aphid, Acyrthosiphon pisum (Harris), Nabis spp., Hippodamia spp., and Chrysopa spp. in lentils (Lens culinaris Medikus). Relative effects of the abiotic environment, predators, and time of sampling on population estimates also were determined during 2 yr. Original counts, area, and volume adustments were used to evaluate accuracy of the sampling method. Volume adjustment was most accurate and was used in all subsequent evaluations. Sweep net estimates of pea aphid, Nabis spp., and Hippodamia spp. densities were similar to those obtained with absolute and D-vac sampling methods, although sweep net sampling consistently gave lower population estimates than those found for absolute sampling. In these experiments, the sweep net did not adequately sample the Chrysopa spp. in lentils. The time of sampling was significant when sampling for pea aphid; however, it was not as important for sampling of the three insect predators. Each year, sweep net samples were taken randomly at two locations in two fields every hour for 72 consecutive hours. The abiotic factors studied were light intensity, temperature, relative humidity, and wind velocity; Nabis spp., Hippodamia spp., and Chrysopa spp. were the predator groups studied. Light intensity was the only abiotic factor that was significantly correlated with pea aphid numbers over both years, whereas all four abiotic factors had significant correlations at low aphid densities in 1983. The diurnal sine of hour was significantly and positively correlated with number of aphids collected by sweep net each hour, whereas predator densities were significantly and negatively correlated with aphid densities over both years. Optimum sampling time for pea aphids in lentils can depend on the dominant predator group being sampled; however, for pea aphids and all predator groups,. Journal of economic entomology. Apr 1989. v. 82 (2). p. 491-506. Includes references. (NAL Call No.: DNAL 421 J822).

0679

Compatibility of intercropping with mechanized agriculture: effects of strip intercropping of pinto beans and sweet corn on insect abundance in Colorado.
JEENAI. Capinera, J.L. Weissling, T.J.; Schweizer, E.E. College Park, Md. : Entomological Society of America. Journal of economic entomology. Apr 1985. v. 78 (2). p. 354-357. ill. Includes references. (NAL Call No.: DNAL 421 J822).

0680

Control of pests with annonaceous acetogenins.
Mikolajczak, K.L. McLaughlin, J.L.; Rupprecht, J.K. Washington, D.C.? : The Department. Tetrahydrofuranoid acetogenins characteristic of the Annonaceae plant family have been found to have potent pesticidal and feeding deterrent activity against a diverse variety of pests such as mosquito larvae, spider mites, aphids, the Mexican bean beetle, striped cumcumber beetle, blowfly larvae, and nematodes. A new acetogenin called "asimicin" having the following structural formula has been isolated and is typical of the subject class of useful compounds. United States Department of Agriculture patents. Copies of USDA patents are available for a fee from the Commissioner of Patents and Trademarks, U.S. Patents and Trademarks Office, Washington, D.C. 20231. Jan 26, 1988. (4,721,727). 1 p. Includes references. (NAL Call No.: DNAL aT223.V4A4).

0681

Control of the Mexican bean beetle on pinto beans.
WAEBA. Burkhardt, C.C. Edwards, J.M.; Bennett, L.E. Laramie : The Station. Bulletin B - Wyoming, Agricultural Experiment Station. 1986. (885). p. 189-192. (NAL Call No.: DNAL 100 W99 (1)).

0682

Cowpea curculio, Chalcodermes aeneus Boheman (Coleoptera: Curculionidae); insecticidal control on the southern pea in Georgia, 1980-1986.
AAREEZ. Chalfant, R.B. Young, J.R. New York : Springer. Applied agricultural research. 1988. v. 3 (1). p. 8-11. Includes references. (NAL Call No.: DNAL S539.5.A77).

0683

Developmental changes in the microsomal monooxygenase system and the in vivo metabolism of aldrin in larvae of the Mexican bean beetle (Coleoptera: Coccinellidae).
JEENAI. Jesudason, P. Levi, P.E.; Weiden, M.; Roe, R.M. Lanham, Md. : Entomological Society of America. Journal of economic entomology. Dec

1988. v. 81 (6). p. 1598-1605. Includes references. (NAL Call No.: DNAL 421 J822).

0684

Dicamba, chlorsulfuron, and clopyralid as sprayer contaminants on sunflower (Helianthus annuus), mustard (Brassica juncea), and lentil (Lens culinaris), respectively.
WEESA6. Derksen, D.A. Champaign, Ill. : Weed Science Society of America. Simulated sprayer tank residues of the broadleaf weed herbicides dicamba, chlorsulfuron, and clopyralid applied alone and with the grass weed herbicides sethoxydim and diclofop on sunflower, tame mustard, and lentil, respectively, caused visible crop injury and reduced dry weight and yield. Dry weight production in the greenhouse and crop tolerance ratings in the field indicated that the grass weed herbicides enhanced crop injury from dicamba, chlorsulfuron, and clopyralid. Yield reductions in field experiments were also greater when dicamba and clopyralid were mixed with grass weed herbicides and applied on sunflower and lentil, respectively. This did not occur with chlorsulfuron applied to mustard. When mixed with simulated broadleaf weed herbicide residues, diclofop enhanced dry weight reductions and crop injury and reduced yield to a greater extent than sethoxydim. Crop tolerance ratings differentiated treatments and rates but were not a good estimate of the extent of yield loss. When broadleaf weed herbicides were applied at rates simulating sprayer tank residues alone or combined with grass weed herbicides, yield losses ranged up to 40% in sunflower, 70% in mustard, and 95% in lentil, compared to the untreated check. Weed science. July 1989. v. 37 (4). p. 616-621. Includes references. (NAL Call No.: DNAL 79.8 W41).

0685

Direct toxicity and repellent activity of pyrethroids against Tetranychus urticae (Acari: Tetranychidae).
JEENAI. Penman, D.R. Chapman, R.B.; Bowie, M.H. College Park, Md. : Entomological Society of America. Journal of economic entomology. Oct 1986. v. 79 (5). p. 1183-1187. Includes references. (NAL Call No.: DNAL 421 J822).

0686

Economic injury level, action threshold, and a yield-loss model for the pea aphid, Acyrthosiphon pisum (Homoptera: Aphididae), on green peas, Pisum sativum.
JEENAI. Yencho, G.C. Getzin, L.W.; Long, G.E. College Park, Md. : Entomological Society of America. Journal of economic entomology. Dec 1986. v. 79 (6). p. 1681-1687. Includes references. (NAL Call No.: DNAL 421 J822).

0687

Effect of a parasitic mite, Coccipolipus epilachnae, on fecundity, food consumption and longevity of the Mexican bean beetle.
GENSAB. Cantwell, G.E. Cantelo, W.W.; Cantwell, M.A. Tifton, Ga. : The Society. Journal of Entomological Science. Apr 1985. v. 20 (2). p. 199-203. Includes references. (NAL Call No.: DNAL QL461.G4).

0688

Effect of beetle regurgitant on plant virus transmission using the gross wounding technique.
PHYTAJ. Monis, J. Scott, H.A.; Gergerich, R.C. St. Paul, Minn. : American Phytopathological Society. Phytopathology. Aug 1986. v. 76 (8). p. 808-811. Includes references. (NAL Call No.: DNAL 464.8 P56).

0689

Effect of beta-exotoxin of Bacillus thuringiensis on development of the Mexican bean beetle (Coleoptera: Coccinellidae).
GRLEA. Cantwell, G.E. Cantelo, W.W.; Cantwell, M.A. East Lansing, Mich. : Michigan Entomological Society. The Great Lakes entomologist. Summer 1986. v. 19 (2). p. 77-80. Includes references. (NAL Call No.: DNAL QL461.M5).

0690

Effect of chlordimeform on tarnished plant bug (Heteroptera: Miridae) nymph emergence.
JEENAI. Bailey, J.C. Cathey, G.W. College Park, Md. : Entomological Society of America. Journal of economic entomology. Dec 1985. v. 78 (6). p. 1485-1487. Includes references. (NAL Call No.: DNAL 421 J822).

0691

Effect of droplet and formulation parameters on pest control efficiency.
Hall, F.R. Philadelphia, Pa. : ASTM, c1986. Pesticide formulations and application systems : fifth volume : symposium sponsored by ASTM Committee E-35 on Pesticides, Kansas City, Mo., 7-8 Nov. 1984 / L.D. Spicer and T.M. Kaneko. p. 23-28. Includes references. (NAL Call No.: DNAL SB950.93.P47 1986).

0692

The effect of host-plant density of the numbers of Mexican bean beetles, Epilachna varivestis.
AMNAA. Turchin, P. Notre Dame, Ind. : University of Notre Dame. American midland naturalist. Jan 1988. v. 119 (1). p. 15-20. ill. Includes references. (NAL Call No.: DNAL

410 M58).

0693

Effect of host plant on cannibalism rates by fall armyworm (Lepidoptera: Noctuidae) larvae.
EVETEX. Raffa, K.F. College Park, Md. : Entomological Society of America. Environmental entomology. June 1987. v. 16 (3). p. 672-675. Includes references. (NAL Call No.: DNAL QL461.E532).

0694

Effect of peat: vermiculite mixes containing Trichoderma harzianum on increased growth response of radish.
JOSHB. Paulitz, T. Windham, M.; Baker, R. Alexandria, Va. : The Society. Journal of the American Society for Horticultural Science. Sept 1986. v. 111 (5). p. 810-814. Includes references. (NAL Call No.: DNAL 81 S012).

0695

Effect of polyculture system on Mexican bean beetle, leafhopper and corn earworm populations.
Mebrahtu, T. Rangappa, M.; Benepal, P.S. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1987. v. 30. p. 10-12. Includes references. (NAL Call No.: DNAL SB327.A1B5).

0696

Effect of proteinase inhibitors on bean weevil (Acanthoscelides obtectus) growth, development, and gut proteolytic activity.
Nielsen, S.S. Shade, R.E.; Pomeroy, M.A. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1988. v. 31. p. 98-99. Includes references. (NAL Call No.: DNAL SB327.A1B5).

0697

Effects of food plants and duration of hibernal quiescence on reproductive capacity of pea leaf weevil (Coleoptera: Curculionidae).
JEENAI. Schotzko, D.J. O'Keeffe, L.E. College Park, Md. : Entomological Society of America. Journal of economic entomology. Apr 1988. v. 81 (2). p. 490-496. Includes references. (NAL Call No.: DNAL 421 J822).

0698

Effects of food type, duration of hibernal quiescence, and weevil density on longevity of Sitona lineatus (Coleoptera: Curculionidae).
JEENAI. Schotzko, D.J. O'Keeffe, L.E. Lanham, Md. : Entomological Society of America. Journal of economic entomology. Dec 1988. v. 81 (6). p. 1631-1636. Includes references. (NAL Call No.: DNAL 421 J822).

0699

Effects of insecticide and plant populations on the insect pests and yield of common bean (Phaseolus vulgaris L.).
JEENAI. Karel, A.K. Mghogho, R.M.K. College Park, Md. : Entomological Society of America. Journal of economic entomology. Aug 1985. v. 78 (4). p. 917-921. ill. Includes references. (NAL Call No.: DNAL 421 J822).

0700

Effects of intercropping beans and onions on populations of Liriomyza spp. and associated parasitic Hymenoptera.
PHESA. Johnson, M.W. Mau, R.F.L. Honolulu : The Society. Proceedings of the Hawaiian Entomological Society. Dec 15, 1986. v. 27. p. 95-103. Includes references. (NAL Call No.: DNAL 420 H312).

0701

Effects of ozone on Mexican bean beetle (Epilanchna varivestis) feeding and egg-laying efficiency on bean (Phaseolus vulgaris L.).
Rangappa, M. Kraemer, M.E.; Dunning, J.; Benepal, P.S.; Robbins, E. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. Mar 1986. v. 29. p. 100. (NAL Call No.: DNAL SB327.A1B5).

0702

Effects of plant diversity and density on the emigration rate of two ground beetles, Harpalus pennsylvanicus and Evarthrus sodalis (Coleoptera: Carabidae), in a system of tomatoes and beans.
EVETEX. Perfecto, I. Horwith, B.; Vandermeer, J.; Schultz, B.; McGuinness, H.; Dos Santos, A. College Park, Md. : Entomological Society of America. Environmental entomology. Oct 1986. v. 15 (5). p. 1028-1031. ill. Includes references. (NAL Call No.: DNAL QL461.E532).

0703

Effects of plant diversity, host density, and host size on population ecology of the Colorado potato beetle (Coleoptera: Chrysomelidae).
EVETEX. Horton, D.R. Capinera, J.L. College Park, Md. : Entomological Society of America. Environmental entomology. Aug 1987. v. 16 (4). p. 1019-1026. Includes references. (NAL Call No.: DNAL QL461.E532).

0704

Effects of spray drop size distribution of drops containing bifenthrin on Tetranychus urticae (Acari: Tetranychidae).
JEENAI. Alm, S.R. Reichard, D.L.; Hall, F.R. College Park, Md. : Entomological Society of America. Journal of economic entomology. Apr 1987. v. 80 (2). p. 517-520. Includes references. (NAL Call No.: DNAL 421 J822).

0705

Effects of variably resistant soybean and lima bean cultivars on Pediobius foveolatus (Hymenoptera: Eulophidae), a parasitoid of the Mexican bean beetle, Epilachna varivestis (Coleoptera: Coccinellidae).
EVETEX. Kauffman, W.C. Flanders, R.V. College Park, Md. : Entomological Society of America. Environmental entomology. Dec 1985. v. 14 (6). p. 678-682. Includes references. (NAL Call No.: DNAL QL461.E532).

0706

Entomology fact sheet: the cowpea curculio.
Adams, D.B. Athens, Ga. : The Service. Leaflet - Cooperative Extension Service, University of Georgia. 1986. (56, rev.). 2 p. ill. (NAL Call No.: DNAL 275.29 G29L).

0707

European corn borer.
Edwards, C.R. Bergman, M.K.; Matthew, D.L. Jr. Lafayette : The Service. Publication E - Purdue University, Cooperative Extension Service. Subseries: Field crops insects. Nov 1985. (17,rev.). 6 p. ill., maps. (NAL Call No.: DNAL SB844.I6P8).

0708

Evaluation of dewinged spined soldier bugs, Podisus maculiventris (Say), for longevity and suppression of the Mexican bean beetle, Epilachna varivestis Mulsant, on snapbeans.
GENSAB. Lambdin, P.L. Baker, A.M. Tifton, Ga. : The Entomological Science Society. Journal of Entomological Science. July 1986. v. 21 (3). p. 263-266. Includes references. (NAL Call No.: DNAL QL461.G4).

0709

Evaluation of pheromone traps for monitoring lesser cornstalk borer adults in beans.
SENTD. Loera, J. Lynch, R.E. College Station, Tex. : Southwestern Entomological Society. The Southwestern entomologist. Mar 1987. v. 12 (1). p. 51-56. Includes references. (NAL Call No.: DNAL QL461.S65).

0710

Evaluation of selected insecticides for control of Mexican bean beetles and potato leafhoppers on snap beans and lima beans.
TFHSA. Lambdin, P. Horton, J.; Muegge, M. Knoxville, Tenn. : The Station. Tennessee farm and home science - Tennessee Agricultural Experiment Station. Spring 1987. (142). p. 6-8. ill. Includes references. (NAL Call No.: DNAL 100 T25F).

0711

Feeding deterrency of some pyrrolizidine, indolizidine, and quinolizidine alkaloids towards pea aphid (Acyrthosiphon pisum) and evidence for phloem transport of indolizidine alkaloid swainsonine.
JCECD. Dreyer, D.L. Jones, K.C.; Molyneux, R.J. New York, N.Y. : Plenum Press. Journal of chemical ecology. Aug 1985. v. 11 (8). p. 1045-1051. Includes references. (NAL Call No.: DNAL QD415.A1J6).

0712

A fluorescence microscopy method for the rapid localization of fungal spores and penetration sites on insect cuticle.
JIVPA. Butt, T.M. Duluth, Minn. : Academic Press. Journal of invertebrate pathology. July 1987. v. 50 (1). p. 72-74. ill. (NAL Call No.: DNAL 421 J826).

0713

Genetic contribution to the dispersal polymorphism of the cowpea weevil (Coleoptera: Bruchidae).
AESAAI. Messina, F.J. College Park, Md. : The Society. Annals of the Entomological Society of America. Jan 1987. v. 80 (1). p. 12-16. Includes references. (NAL Call No.: DNAL 420 EN82).

0714

Genetic relationships among seventeen Aphidius (Hymenoptera: Aphidiidae) populations, including six species.
AESAAI. Unruh, T.R. White, W.; Gonzalez, D.; Woolley, J.B. Lanham, Md. : The Society. Annals of the Entomological Society of America. Nov

1989. v. 82 (6). p. 754-768. Includes references. (NAL Call No.: DNAL 420 EN82).

0715

Growth stages of field peas sensitive to damage by the pea aphid, Acyrthosiphon pisum (Homoptera: Aphididae).
JEENAI. Maiteki, G.A. Lamb, R.J. College Park, Md. : Entomological Society of America. Journal of economic entomology. Dec 1985. v. 78 (6). p. 1142-1448. Includes references. (NAL Call No.: DNAL 421 J822).

0716

Heritability of resistance in cowpea to the western plant bug.
CRPSAY. Bosque-Perez, N.A. Foster, K.W.; Leigh, T.F. Madison, Wis. : Crop Science Society of America. Crop science. Nov/Dec 1987. v. 27 (6). p. 1133-1136. Includes references. (NAL Call No.: DNAL 64.8 C883).

0717

Host suitability of Phaseolus lunata for Trichoplusia ni (Lepidoptera: Noctuidae) in controlled carbon dioxide atmospheres.
EVETEX. Osbrink, W.L.A. Trumble, J.T.; Wagner, R.E. College Park, Md. : Entomological Society of America. Environmental entomology. June 1987. v. 16 (3). p. 639-644. ill. Includes references. (NAL Call No.: DNAL QL461.E532).

0718

Hyperparasitoids from pea aphid mummies, Acyrthosiphon pisum (Homoptera: Aphididae), in North America.
AESAAI. Mertins, J.W. College Park, Md. : The Society. Annals of the Entomological Society of America. Mar 1985. v. 78 (2). p. 186-197. ill. Includes references. (NAL Call No.: DNAL 420 EN82).

0719

Incidence and control of pest insects in conventional and no-tillage snap beans.
JESCEP. Sherrod, D.W. Wilson, H.P. Tifton, Ga. : Georgia Entomological Society. Journal of entomological science. Apr 1989. v. 24 (2). p. 161-167. Includes references. (NAL Call No.: DNAL QL461.G4).

0720

Infesting cotton with tarnished plant bug (Heteroptera: Miridae) nymphs reared by improved laboratory rearing methods.
JEENAI. Bailey, J.C. College Park, Md. : Entomological Society of America. Journal of economic entomology. Oct 1986. v. 79 (5). p. 1410-1412. Includes references. (NAL Call No.: DNAL 421 J822).

0721

Influence of cultivar, nitrogen, and frequency of insecticide application on vegetable leafminer (Diptera: Agromyzidae) population density and dispersion on snap beans.
JEENAI. Hanna, H.Y. Story, R.N.; Adams, A.J. College Park, Md. : Entomological Society of America. Journal of economic entomology. Feb 1987. v. 80 (1). p. 107-110. Includes references. (NAL Call No.: DNAL 421 J822).

0722

Influence of garden symphylan (Symphyla: Scutigerellidae) root injury on physiological processes in snap beans.
EVETEX. Eltoum E.M.A. Berry, R.E. College Park, Md. : Entomological Society of America. Environmental entomology. Aug 1985. v. 14 (4). p. 408-412. Includes references. (NAL Call No.: DNAL QL461.E532).

0723

Influence of host plant on deterrence by azadirachtin of feeding by fall armyworm larvae (Lepidoptera: Noctuidae).
JEENAI. Raffa, K.F. College Park, Md. : Entomological Society of America. Journal of economic entomology. Apr 1987. v. 80 (2). p. 384-387. Includes references. (NAL Call No.: DNAL 421 J822).

0724

Influence of ovipositional resource quality on fecundity of the seedcorn fly (Diptera: Anthomyiidae).
EVETEX. Weston, P.A. Miller, J.R. Lanham, Md. : Entomological Society of America. In the presence of ample food and water, host-deprived seedcorn fly, Delia platura (Meigen), females laid half as many eggs during their lifetimes as did flies exposed to germinating lima beans, which provide strong ovipositional stimuli for seedcorn flies. In addition, host-deprived D. platura matured eggs at about half the rate of undeprived flies and took twice as long to begin ovipositing. We concluded that germinating lima beans acted as a strong reproductive "primer" for seedcorn fly females. Seedcorn flies exposed to beans until 2 d after first oviposition and then offered only moist sand as ovipositional sites deposited eggs at

half the rate of their undeprived counterparts for 4 d; for the remaining 6 d of the experiment, egg deposition for the host-deprived group rebounded to 22 eggs per d. Although compensations in release rates for well-primed D. platura can occur in a few days, the cumulative effects of depriving D. platura of highly suitable ovipositional sites are pronounced over a lifetime, giving credence to the notion that highly unpreferred host plants might exhibit partial resistance in a no-choice situation. Environmental entomology. Apr 1987. v. 16 (2). p. 400-404. Includes references. (NAL Call No.: DNAL QL461.E532).

0725

Inheritance and combining ability of leafhopper defense mechanisms in common bean.
CRPSAY. Kornegay, J.L. Temple, S.R. Madison, Wis. : Crop Science Society of America. Crop science. Nov/Dec 1986. v. 26 (6). p. 1153-1158. Includes references. (NAL Call No.: DNAL 64.8 C883).

0726

Injury and control of onion thrips (Thysanoptera: Thripidae) on edible podded peas.
JEENAI. Shelton, A.M. North, R.C. Lanham, Md. Entomological Society of America. Harvests of edible podded peas from commercial fields in upstate New York during 1984 contained two types of injury previously unreported in the United States. Damage to pods consisted of either small raised bumps or scars appearing as silver mottling. Field-sampling indicated the presence of onion thrips, Trips tabaci Lindeman, so greenhouse and field tests were designed to assess its ability to cause this injury and strategies for control. Results from greenhouse and field trials demonstrated that the scars were caused by T. tabaci. In greenhouse trials, T. tabaci reproduced on peas and caused scars. A single application of parathion at the prebloom or bloom stage was effective in eliminating all thrips and scarring, whereas an application at pod initiation allowed a low but noticeable level of damage. In field trials, applications of parathion and dimethoate provided comparable control of scars. In one field trial it was necessary to apply an application at either the prebloom or bloom stage, followed by an additional application at the next crop stage (i.e., bloom or pod-initiation stage, respectively), to achieve greater than 70% scar-free pods. Counts of total thysanopteran larvae in treated plots before harvest indicated that both insecticides were effective in reducing larval populations. In another field trial in which thrips populations were much higher, no treatments were effective in reducing scarring injury. In greehouse and field trials the occurrenceof bumps was not reduced by the use of insecticides, nor did it appear related to thrips numbers, thus indicating that they were not the cause of this blemish. Journal of economic entomology. Dec 1987. v. 80 (6). p. 1325-1330. ill. Includes references. (NAL Call No.: DNAL 421 J822).

0727

Insect answers: Pea leaf weevil: its biology and control.
WUEXA. Antonelli, A. Retan, A.; O'Keefe, L.E.; Johansen, C. Pullman, Wash. : The Service. Extension bulletin - Washington State University, Cooperative Extension Service. June 1985. (903,rev.). 3 p. ill. (NAL Call No.: DNAL 275.29 W27P).

0728

Insect answers: Pea leafminer.
WUEXA. Gary, W.J. Mayer, D.F.; Antonelli, A.L. Pullman, Wash. : The Service. Extension bulletin - Washington State University, Cooperative Extension Service. Apr 1986. (1372). 2 p. ill. (NAL Call No.: DNAL 275.29 W27P).

0729

Insect pests of cowpeas.
ARENA. Jackai, L.E.N. Daoust, R.A. Palo Alto : Annual Reviews Inc. Annual review of entomology. Literature review. 1986. v. 31. p. 95-119. Includes references. (NAL Call No.: DNAL 421 AN72).

0730

Insecticidal activity and lectin homology of arcelin seed protein.
SCIEA. Osborn, T.C. Alexander, D.C.; Sun, S.S.M.; Cardona, C.; Bliss, F.A. Washington, D.C. : American Association for the Advancement of Science. Science. Apr 8, 1988. v. 240 (4849). p. 207-210. Includes references. (NAL Call No.: DNAL 470 SCI2).

0731

Insects of southern peas.
Jones, B.F. Johnson, D.R. Little Rock, Ark. : The Service. EL - University of Arkansas, Cooperative Extension Service. May 1988. (231,rev.). 6 p. ill. (NAL Call No.: DNAL 275.29 AR4LE).

0732

The integration of a bacterium and parasites to control the Colorado potato beetle and the Mexican bean beetle.
GENSAB. Cantwell, G.E. Cantelo, W.W.; Schroder, R.F.W. Athens, Ga. : The Society. Journal of Entomological Science. Jan 1985. v. 20 (1). p. 98-103. Includes references. (NAL Call No.:

DNAL QL461.G4).

0733

Integumental penetration of the pea aphid, Acyrthosiphon pisum, by Conidiobolus obscurus (Entomophthoraceae).
JIVPA. Brey, P.T. Latge, J.P.; Prevost, M.C. Orlando, Fla. : Academic Press. Journal of invertebrate pathology. July 1986. v. 48 (1). p. 34-41. ill. Includes references. (NAL Call No.: DNAL 421 J826).

0734

Interactions of the parasite Pediobius foveolatus (Hymenoptera: Eulophidae) with two Nosema spp. (Microsporida: Nosematidae) of the Mexican bean beetle (Coleoptera: Coccinellidae).
EVETEX. Own, O.S. Brooks, W.M. College Park, Md. : Entomological Society of America. Environmental entomology. Feb 1986. v. 15 (1). p. 32-39. Includes references. (NAL Call No.: DNAL QL461.E532).

0735

Intra- and interspecific morphological variation in some Aphidius species (Hymenoptera: Aphidiidae) parasitic on the pea aphid in North America.
AESAAI. Kambhampati, S. Mackauer, M. Lanham, Md. : The Society. Annals of the Entomological Society of America. Nov 1988. v. 81 (6). p. 1010-1016. ill. Includes references. (NAL Call No.: DNAL 420 EN82).

0736

Metabolism of benfuracarb in young cotton, bean, and corn plants.
JAFCAU. Tanaka, A.K. Umetsu, N.; Fukuto, T.R. Washington, D.C. : American Chemical Society. Journal of agricultural and food chemistry. Nov/Dec 1985. v. 33 (6). p. 1049-1055. Includes references. (NAL Call No.: DNAL 381 J8223).

0737

Mexican bean beetle.
Ghidiu, G.M. New Brunswick, N.J. : The Service. FS - Cooperative Extension Service, Cook College. 1987. (227). 2 p. ill. (NAL Call No.: DNAL S544.3.N5F7).

0738

Morphological and physiological traits associated with agromyzid (Diptera: Agromyzidae) resistance in mungbean.
JEENAI. Talekar, N.S. Yang, H.C.; Lee, Y.H. College Park, Md. : Entomological Society of America. Morphological and physiological characters of three resistant and two susceptible mungbean accessions were studied to understand the nature of their resistance to agromyzid flies. The highly resistant accession had high trichome density on leaves and stems, purplish and smaller diameter stems, and smaller unifoliate leaves. Agromyzid adults showed lower preference for visiting seedlings of resistant compared with susceptible accessions for feeding and oviposition, which were significantly positively correlated with insect infestation. Pupation of the agromyzid was delayed when larvae were feeding inside stems of resistant compared with susceptible accessions. Plant tissues of resistant accessions damaged by agromyzid feeding had significantly fewer larvae and pupae compared with similar tissues of the susceptible accessions. Larvae of Porthesia taiwana Shiraki and Heliothis armigera Hubner had greater mortality and reduced pupation when fed unifoliate leaves of resistant compared with susceptible mungbean accessions. A combination of several characters appears to be responsible for resistance. Journal of economic entomology. Oct 1988. v. 81 (5). p. 1352-1358. Includes references. (NAL Call No.: DNAL 421 J822).

0739

Mortality of Tetranychus urticae Koch (Acari: Tetranychidae) from abamectin residues: effects of host plant, light, and surfactants.
JESCEP. Mizell, R.F. III. Schiffhauer, D.E.; Taylor, J.L. Tifton, Ga. : The Entomological Science Society. Journal of Entomological Science. Oct 1986. v. 21 (4). p. 329-337. Includes references. (NAL Call No.: DNAL QL461.G4).

0740

Multivariate assessment of inter- and intraspecific variation in performance criteria of several pea aphid parasites (Hymenoptera: Aphidiidae).
AESAAI. Kambhampati, S. Mackauer, M. Lanham, Md. : The Society. Annals of the Entomological Society of America. May 1989. v. 82 (3). p. 314-324. ill. Includes references. (NAL Call No.: DNAL 420 EN82).

0741

Natural enemies of leafhopper of the genus Empoasca (Homoptera: Cicadellidae) in pigeon peas.
JAUPA. Cotte, O. Cruz, C. Rio Piedras, R.R. : University of Puerto Rico, Agricultural Experiment Station. The Journal of agriculture

of the University of Puerto Rico. Apr 1989. v. 73 (2). p. 161-163. (NAL Call No.: DNAL 8 P832J).

0742

New intermediates in the conversion of stigmasterol to cholestanol in the Mexican bean beetle.
LPDSAP. Svoboda, J.A. Cohen, C.F.; Lusby, W.R.; Thompson, M.J. Champaign, Ill. : American Oil Chemists' Society. Lipids. Oct 1986. v. 21 (10). p. 639-642. Includes references. (NAL Call No.: DNAL QP751.L5).

0743

Nymph growth and development, oviposition, and seed damage on cowpea by Lybus hesperus (Heteroptera: Miridae).
JEENAI. Bosque-Perez, N.A. Leigh, T.F.; Foster, K.W.; Duffey, S.S. College Park, Md. : Entomological Society of America. Journal of economic entomology. Dec 1985. v. 78 (6). p. 1254-1258. Includes references. (NAL Call No.: DNAL 421 J822).

0744

Oviposition site preference of Lygus hesperus (Hemiptera: Miridae) on common bean in relation to bean age and genotype.
JEENAI. Alvarado-Rodriquez, B. Leigh, T.F.; Foster, K.W. College Park, Md. : Entomological Society of America. Journal of economic entomology. Aug 1986. v. 79 (4). p. 1069-1072. Includes references. (NAL Call No.: DNAL 421 J822).

0745

Ovipositional rhythms and egg melanization rate of Sitona lineatus (L.) (Coleoptera: Curculionidae).
EVETEX. Schotzko, D.J. O'Keeffe, L.E. College Park, Md. : Entomological Society of America. Environmental entomology. June 1986. v. 15 (3). p. 601-606. Includes references. (NAL Call No.: DNAL QL461.E532).

0746

Pathogenicity of Beauveria bassiana and Zoophthora radicans to the coccinellid predators Coleomegilla maculata and Eriopis connexa.
JIVPA. Magalhaes, B.P. Lord, J.C.; Wraight, S.P.; Daoust, R.A.; Roberts, D.W. Duluth, Minn. : Academic Press. Journal of invertebrate pathology. Nov 1988. v. 52 (3). p. 471-473. (NAL Call No.: DNAL 421 J826).

0747

Pea leaf weevil: its biology and control.
WUEXA. Antonelli, A. Retan, A.; O'Keefe, L.E.; Johansen, C. Pullman, Wash. : The Service. Extension bulletin - Washington State University, Cooperative Extension Service. June 1985. (0903). 3 p. ill. (NAL Call No.: DNAL 275.29 W27P).

0748

Pest control in commercial pea production.
Stevenson, W.R. Wedberg, J.L.; Doersch, R.E.; Harvey, R.G. Madison, Wis. : The Programs. Publication - Cooperative Extension Programs. University of Wisconsin - Extension. Jan 1985. (A3316). 8 p. ill. (NAL Call No.: DNAL S544.3.W6W53).

0749

Pest control in commercial snap bean production.
Binning, L.K. Wyman, J.A.; Stevenson, W.R. Madison, Wis. : The Programs. Publication - Cooperative Extension Programs. University of Wisconsin - Extension. Jan 1985. (A2329). 8 p. ill. (NAL Call No.: DNAL S544.3.W6W53).

0750

Pests not known to occur in the United States or of limited distribution. 83. Bean butterfly.
Whittle, K. Hyattsville, Md. : The Service. APHIS 81 - U.S. Department of Agriculture, Animal and Plant Health Inspection Service. Sept 1987. (50). 10 p. ill., maps. Includes references. (NAL Call No.: DNAL aSB599.A3U5).

0751

Pests not known to occur in the United States or of limited distribution. 86. A tortricid moth.
Whittle, K. Hyattsville, Md. : The Service. APHIS 81 - U.S. Department of Agriculture, Animal and Plant Health Inspection Service. Sept 1987. (50). 6 p. ill., maps. Includes references. (NAL Call No.: DNAL aSB599.A3U5).

0752

Plant-mediated effects of postemergence herbicides on Epilachna varivestis (Coleoptera: Coccinellidae).
EVETEX. Agnello, A.M. Bradley, J.R. Jr.; Van Duyn, J.W. College Park, Md. : Entomological Society of America. Environmental entomology. Feb 1986. v. 15 (1). p. 216-220. Includes references. (NAL Call No.: DNAL QL461.E532).

0753

Predation by the western predatory mite (Acari: Phytoseiidae) on the Pacific spider mite (Acari: Tetranychidae) in the presence of road dust.
EVETEX. Oi, D.H. Barnes, M.M. Lanham, Md. : Entomological Society of America. Laboratory and greenhouse studies examined the effects of road dust on predation by the western predatory mite, Typhlodromus (=Galandromus) occidentalis (Nesbitt), on the Pacific spider mite, Tetranychus pacificus McGregor. Significantly fewer Pacific spider mites were found on bean plants and almond trees with western predatory mites regardless of the presence or absence of dust. A detrimental effect of dust was not evident on populations of western predatory mites. The effect of dust on populations of Pacific spidermites was not conclusive because high and low populations were associated spider mites was presence of dust. In addition to dust and predators, we examined the effect of almond tree water stress on predation. Water stress did not have any significant effects on either population, however the accumulated degree hour difference between stressed and nonstressed trees was low. These studies suggest that road dust does not influence predation by western predatory mites on Pacific spider mites. Environmental entomology. Oct 1989. v. 18 (5). p. 892-896. Includes references. (NAL Call No.: DNAL QL461.E532).

0754

Presence--absence sequential decision plans for Tetranychus urticae (Acari: Tetranychidae) in garden-seed beans, Phaseolus vulgaris.
JEENAI. Bechinski, E.J. Stoltz, R.L. College Park, Md. : Entomological Society of America. Journal of economic entomology. Includes statistical data. Dec 1985. v. 78 (6). p. 1475-1480. Includes references. (NAL Call No.: DNAL 421 J822).

0755

Proceedings of a Meeting on Biological Control of the Mexican Bean Beetle Through the Use of Insect Parasites Beneficial Insects Research Laboratory, U.S. Department of Agriculture, Newark, Delaware, March 14, 1989 /compiled by Paul W. Schaefer and Robert M. Hendrickson, Jr.
Schaefer, Paul W.; Hendrickson, Robert M. 1989. Cover title. 59 leaves : ill., maps ; 28 cm. Includes bibliographies. (NAL Call No.: DNAL SB933.3.M4 1989).

0756

Protecting field and forage crops from green cloverworm.
MUCBA. Ruppel, R.F. Parker, K.A. East Lansing, Mich. : The Service. Extension bulletin E - Cooperative Extension Service, Michigan State University. Apr 1985. (1793). 2 p. ill. (NAL Call No.: DNAL 275.29 M58B).

0757

Protecting field and forage crops from potato leafhopper.
MUCBA. Ruppel, R.F. Parker, K.A. East Lansing, Mich. : The Service. Extension bulletin E - Cooperative Extension Service, Michigan State University. Apr 1985. (1794). 3 p. ill. (NAL Call No.: DNAL 275.29 M58B).

0758

Quantification of insect-induced foliage damage using a high-capacity laboratory bioassay.
JEENAI. Herman, R.A. Lanham, Md. : Entomological Society of America. A high-capacity assay designed to evaluate insect-induced foliage damage was developed based on the optical density of dimethyl sulfoxide extracts of leaf tissue. The assay reliably indexed foliage damage induced by both chewing insects, Spodoptera eridania (Cramer), and piercing-sucking insects, Empoasca abrupta DeLong. Results from this assay correlated well with simulated damage levels, insect infestation levels, leaf dry-weight measurements, and visual leaf damage estimates. Results from dose-response tests with malathion using larvae of S. eridania indicate that this assay is useful for evaluating chemicals for their ability to protect plants from insect damage. The assay could be adapted to evaluate other types of plant damage such as those induced by herbicides, air pollutants, or disease. Journal of economic entomology. Dec 1989. v. 82 (6). p. 1836-1842. ill. Includes references. (NAL Call No.: DNAL 421 J822).

0759

Resistance to foliar beetle, Ootheca bennigseni (Coleoptera: Chrysomelidae) in common beans.
EVETEX. Karel, A.K. Rweyemamu, C.L. College Park, Md. : Entomological Society of America. Environmental entomology. Dec 1985. v. 14 (6). p. 662-664. Includes references. (NAL Call No.: DNAL QL461.E532).

0760

The response of beans (Phaseolus vulgaris L.) to phorate treatments during rainy and dry season plantings.
Barrigossi, J.A.F. Chandler, L.; Lopes, N.F. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1988. v. 31. p. 157-158. (NAL Call No.: DNAL SB327.A1B5).

0761

Root rot of snap beans in New York.
NYFSB. Abawi, G.S. Crosier, D.C.; Cobb, A.C. Geneva, N.Y. : New York (State), Agricultural Experiment Station, Geneva. New York's food and life sciences bulletin. 1985. (110). 7 p. ill. (NAL Call No.: DNAL S95.E22).

0762

Selection for behavioral resistance in twospotted spider mite (Acari: Tetranychidae) to flucythrinate.
JEENAI. Penman, D.R. Chapman, R.B.; Bowie, M.H. Lanham, Md. : Entomological Society of America. When populations of the twospotted spider mite, Tetranychus urticae Koch, were selected repeatedly in the laboratory with the pyrethroid flucythrinate, their behavioral responses to exposure to residues changed. Methods were developed to permit approximately equal segregation between treated and untreated primary leaves of French dwarf bean plants, Phaseolus vulgaris L., over a 24-h exposure period. Behavioral selections for increased or decreased irritability to flucythrinate residues continued for 11 selections. To maintain equal segregation, the concentration for selections for decreased irritability was incrementally increased from an initial value of 0.003 g (AI)/liter in selection 4 to reach 0.25 g (AI)/liter at selection 11. Selection for increased irritability was accomplished by decreasing concentrations from the initial 0.003 g (AI)/liter in selections 1 to 8, to 0.008 g (AI)/liter by selection 11. Slide-dip tests at the recommended field rate (0.05 g AI /liter) showed no change in physiological resistance in either behavioral selections. Journal of economic entomology. Feb 1988. v. 81 (1). p. 40-44. Includes references. (NAL Call No.: DNAL 421 J822).

0763

Sequential decision plan for control of pea aphid, Acyrthosiphon pisum (Homoptera: Aphididae), on field peas in Manitoba.
JEENAI. Maiteki, G.A. Lamb, R.J. College Park, Md. : Entomological Society of America. Journal of economic entomology. June 1987. v. 80 (3). p. 605-607. Includes references. (NAL Call No.: DNAL 421 J822).

0764

Some host plants of leafhopper, (Empoasca spp. (Homoptera: Cicadellidae) found on pigeon pea (Cajanus cajan L.) fields.
JAUPA. Cotte, O. Cryz, C. Mayaguez : University of Puerto Rico, Agricultural Experiment Station. The Journal of agriculture of the University of Puerto Rico. July 1988. v. 72 (3). p. 499-500. Includes references. (NAL Call No.: DNAL 8 P832J).

0765

Sporulation by hyphal bodies of Nomuraea rileyi and subsequent infection of Heliothis spp.
JIVPA. Holdom, D.G. Klashorst, G. van de. Duluth, Minn. : Academic Press. Journal of invertebrate pathology. Sept 1986. v. 48 (2). p. 242-245. (NAL Call No.: DNAL 421 J826).

0766

Spray timing and economic threshold for the pea aphid Acyrthosiphon pisum (Homoptera: Aphididae), on field peas in Manitoba.
JEENAI. Maiteki, G.A. Lamb, R.J. College Park, Md. : Entomological Society of America. Journal of economic entomology. Dec 1985. v. 78 (6). p. 1449-1454. Includes references. (NAL Call No.: DNAL 421 J822).

0767

Structural and photosynthetic compensation for leafminer (Diptera: Agromyzidae) injury in lima beans.
EVETEX. Martens, B. Trumble, J.T. Lanham, Md. : Entomological Society of America. Palisade mesophyll tissue removed from mature leaves of Phaseolus lunatus L. by the leafmining herbivore Liriomyza trifolii (Burgess) was replaced with photosynthetically active cells, permitting virtually complete recovery from injury. No significant differences in biomass production or levels of ribulose-1,5-bisphosphate carboxylase were observed between damaged and control plants. Decreases in photosynthesis did not exceed 10% for leaves with approximately one-fourth of the leaf area mined. Development of other, photosynthetically inactive callus cells along vascular bundles and frass deposits served to compartmentalize leafmines, generating a suitable microclimate for regeneration of cells as well as preventing intrusion of disease inoculum and arthropod pests. Such cellular regrowth not only benefits the host, but provides substantial advantages for facultatively cannibalistic larvae that are incapable of relocating to undamaged leaves. Environmental entomology. Apr 1987. v. 16 (2). p. 374-378. ill. Includes references. (NAL Call No.: DNAL QL461.E532).

0768

Sweep-net sampling for western spotted cucumber beetle (Coleoptera: Chrysomelidae) in snap beans: spatial distribution, economic injury level, and sequential sampling plans.
JEENAI. Weinzierl, R.A. Berry, R.E.; Fisher, G.C. Lanham, Md. : Entomological Society of America. Sweep-net and absolute density samples for adult western spotted cucumber beetle (WSCB), Diabrotica undecimpunctata undecimpunctata Mannerheim (Coleoptera: Chrysomelidae), in snap beans, Phaseolus vulgaris L., were analyzed using Iwao's patchiness regression and Taylor's power law.

Iwao's patchiness regression described sweep-net and absolute density samples better than Taylor's power law. The equation that described the patchiness regression of sweep sampling data was M = 0.10 + 1.07m. Linear regression analysis of the relationship between WSCB relative density and snap bean pod damage provided the basis for estimating the economic injury level for WSCB in snap beans at a daily average of 4.1 beetles per 10 sweeps (corrected) during the 14 d preceding harvest. An average of 3.0 beetles per 10 sweeps (corrected) was proposed as the economic threshold. Thresholds adjusted to compensate for circadian variation in sweep sampling efficiency ranged form 1.2 to 3.3 beetles per 10 sweeps (uncorrected). Adjusted thresholds were used with alpha and beta values from the sweep-net patchiness regression to construct critical-density sequential sampling plans modified for specific sampling times. Sequential sampling plans for fixed-precision population density estimates also were constructed. Journal of economic entomology. Dec 1987. v. 80 (6). p. 1278-1283. Includes references. (NAL Call No.: DNAL 421 J822).

0769

Sweep-net sampling for western spotted cucumber beetle (Coleoptera: Chrysomelidae) in snap beans: spatial distribution, economic injury level, and sequential sampling plans.
JEENAI. Weinzierl, R.A. Berry, R.E.; Fisher, G.C. College Park, Md. : Entomological Society of America. Journal of economic entomology. Dec 1987. v. 80 (6). p. 1278-1283. Includes references. (NAL Call No.: DNAL 421 J822).

0770

Synthesis of proteins and nucleic acids by the pea aphid Acyrthosiphon pisum (Aphididae) in the absence of a full complement of dietary amino acids.
Srivastava, P.N. Srivastava, U.; Thakur, M.; Auclair, J.L. New York, N.Y. : Alan R. Liss, Inc. Archives of insect biochemistry and physiology. Mar 1987. v. 4 (3). p. 161-168. Includes references. (NAL Call No.: DNAL QL495.A7).

0771

Tests of a spun polyester row cover as a barrier against seedcorn maggot (Diptera: Anthomyiidae) and cabbage pest infestations.
JEENAI. Hough-Goldstein, J.A. College Park, Md. : Entomological Society of America. Journal of economic entomology. Aug 1987. v. 80 (4). p. 768-772. Includes references. (NAL Call No.: DNAL 421 J822).

0772

Toxicity of abamectin to Liriomyza trifolii (Burgess) (Diptera: Agromyzidae).
JEENAI. Leibee, G.L. College Park, Md. Entomological Society of America. Journal of economic entomology. Apr 1988. v. 81 (2). p. 738-740. Includes references. (NAL Call No.: DNAL 421 J822).

0773

Toxicity of clofentezine against the twospotted and carmine spider mites (Acari: Tetranychidae).
JEENAI. Neal, J.W. Jr. McIntosh, M.S.; Gott, K.M. College Park, Md. : Entomological Society of America. Journal of economic entomology. Apr 1986. v. 79 (2). p. 479-483. Includes references. (NAL Call No.: DNAL 421 J822).

0774

Two new species of Nosema (Microsporida: Nosematidae) from the Mexican bean beetle Epilachna varivestis (Coleoptera: Cocinellidae).
JPROA. Brooks, W.M. Hazard, E.I.; Becnel, J. Lawrence, Kan. : Society of Protozoologists. The Journal of protozoology. Aug 1985. v. 32 (3). p. 525-535. ill. Includes 42 references. (NAL Call No.: DNAL 439.8 J82).

0775

Use of chemical and microbial insecticides against pests of common beans.
JEENAI. Karel, A.K. Schoonhoven, A.V. College Park, Md. : Entomological Society of America. Journal of economic entomology. Dec 1986. v. 79 (6). p. 1692-1696. Includes references. (NAL Call No.: DNAL 421 J822).

0776

Varietal evaluation of common beans to foliar beetle, Ootheca bennigseni Weise.
Karel, A.K. Fort Collins, Colo : Howard F. Schwartz, Colorado State University. Annual report of the Bean Improvement Cooperative. 1989. v. 32. p. 86-87. Includes references. (NAL Call No.: DNAL SB327.A1B5).

0777

Volatiles from the foliage of soybean, Glycine max, and lima bean, Phaseolus lunatus: their behavioral effects on the insects Trichoplusia ni and Epilachna varivestis.
JAFCAU. Liu, S.H. Norris, D.M.; Lyne, P. Washington, D.C. : American Chemical Society. Journal of agricultural and food chemistry. Mar/Apr 1989. 37 (2). p. 496-501. ill. Includes references. (NAL Call No.: DNAL 381 J8223).

0778

Comparative studies on the extent of damage caused by root-knot and reniform nematodes on chickpea.
Zaidi, S.B.I. Ahmad, S.; Khan, S.; Siddiqui, M.B. Raleigh, N.C. : Crop Nematode Research & Control Project . International nematology network newsletter. Dec 1988. v. 5 (4). p. 12-13. Includes references. (NAL Call No.: DNAL SB998.N45I5).

0779

Effect of Meloidogyne incognita on plant nutrient concentration and its influence on the physiology of beans.
JONEB. Melakeberhan, H. Webster, J.M.; Brooke, R.C.; D'Auria, J.M.; Cackette, M. Raleigh, N.C. : Society of Nematologists. Journal of nematology. July 1987. v. 19 (3). p. 324-330. Includes references. (NAL Call No.: DNAL QL391.N4J62).

0780

Effects of cowpea and maize root leachates on Meloidogyne incognita egg hatch.
JONEB. Idowu, A.A. Fawole, B. Lake Alfred, Fla. : Society of Nematologists. Journal of nematology. Jan 1990. v. 22 (1). p. 136-138. Includes references. (NAL Call No.: DNAL QL391.N4J62).

0781

Effects of soil moisture and root knot nematode, Meloidogyne hapla (Chitwood), on water relations, growth, and yield in snap bean.
JOSHB. Wilcox-Lee, D.A. Loria, R. Alexandria, Va. : The Society. Journal of the American Society for Horticultural Science. July 1987. v. 112 (4). p. 629-633. Includes references. (NAL Call No.: DNAL 81 SO12).

0782

Effects of soil solarization on Rotylenchulus reniformis in the lower Rio Grande Valley of Texas.
JONEB. Heald, C.M. Robinson, A.F. Raleigh, N.C : Society of Nematologists. Journal of nematology. Jan 1987. v. 19 (1). p. 93-103. Includes references. (NAL Call No.: DNAL QL391.N4J62).

0783

Effects of temperature on development of Heterodera glycines on Glycine max and Phaseolus vulgaris.
JONEB. Melton, T.A. Jacobsen, B.J.; Noel, G.R. Raleigh, N.C. : Society of Nematologists. Journal of nematology. Oct 1986. v. 18 (4). p. 468-474. ill. Includes references. (NAL Call No.: DNAL QL391.N4J62).

0784

Estimated losses due to root-knot nematodes, Meloidogyne incognita, and M. javanica in pea crop.
Sharma, G.L. Raleigh, N.C. : Crop Nematode Research & Control Project . International nematology network newsletter. Mar 1989. v. 6 (1). p. 28-29. Includes references. (NAL Call No.: DNAL SB998.N45I5).

0785

Identification of new sources of resistance to root-knot nematodes in Phaseolus.
CRPSAY. Omwega, C.O. Thomason, I.J.; Roberts, P.A.; Waines, J.G. Madison, Wis. : Crop Science Society of America. Resistance to root-knot nematode. Meloidogyne incognita (Kofoid and white) Chitwood, has been identified and incorporated into commercial cultivars of common bean, Phaseolus vulgaris L. However, the effective use of host resistance as a management tactic against root-knot nematodes attacking common bean requires identification and incorporation of resistance to other economically important rootknot nematodes, namely M. javanica (Treub) Chitwood, M. arenaria and M. hapla. Fifty-four common bean and 64 tepary bean, P. acutifolius A. Gray, lines were screened for resistance to root-knot nematodes under greenhouse and growth chamber conditions. In the greenhouse, the plants were grown in pots filled with loamy sand and, in the growth chamber, the plants were grown in growth pouches. Bean plants in the greehouse were inoculated with 5000 nematode eggs and evaluated for nematode reproduction (eggs) 6 wk after inoculation. In the growth chamber, plants were inoculated with 1000 second-stage juveniles and evaluated for egg numbers 4 wk after inoculation. Common bean lines PI 165426 and Alabama no. 1 were found to be resistant to M. incognita Race 2, 3 and 4 but were susceptible to M. incognita Race 1 and to M. arenaria. Breeding lines A252, A315, A328, A443 and A445 were resistant to M. javanica and M. incognita Race 1. Resistance in the A lines was found to be derived from two common bean landraces, G1805 and G2618. The resistance was also effective against M. arenaria. The tepary bean accession PI 310606 was found to have good resistance to all nematode isolates tested. We postulate that resistance derived from G1805 and G2618 may be under different genetic control than that PI 165426 and Alabama no. 1. Crop science. Nov/Dec 1989. v. 29 (6). p. 1463-1468. Includes references. (NAL Call No.: DNAL 64.8 C883).

0786

A nondestructive technique for screening bean germ plasm for resistance to Meloidogyne incognita.
PLDIDE. Omwega, C.O. Thomason, I.J.; Roberts, P.A. St. Paul, Minn. : American Phytopathological Society. Plant disease. Nov 1988. v. 72 (11). p. 970-972. Includes references. (NAL Call No.: DNAL 1.9 P69P).

0787

The pea cyst nematode.
NASSD. Di Vito, M. Greco, N. New York, N.Y. : Plenum Press. NATO advanced science institutes series : Series A : Life sciences. In the series analytic: Cyst nematodes / edited by F. Lamberti and C.E. Taylor.~ Literature review. 1986. v. 121. p. 321-322. Includes references. (NAL Call No.: DNAL QH301.N32).

0788

Plant pathology fact sheet: snap bean diseases.
Gay, J.D. Athens, Ga. : The Service. Leaflet - Cooperative Extension Service, University of Georgia. June 1985. (114,rev.). 6 p. ill. (NAL Call No.: DNAL 275.29 G29L).

0789

Can diseases be effectively controlled in traditional varietal mixtures using resistant varieties?.
Mukishi, P. Trutmann, P. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1988. v. 31. p. 104-105. Includes references. (NAL Call No.: DNAL SB327.A1B5).

0790

Commercial vegetable production: lima beans.
McLaurin, W.J. Barber, J.M.; Colditz, P. Athens, Ga. : The Service. Circular - Cooperative Extension Service, University of Georgia. Oct 1985. (716,rev.). 4 p. (NAL Call No.: DNAL 275.29 G29C).

0791

Enhanced colonization of pea traproots by a fluorescent pseudomonad biocontrol agent by water infiltration into soil.
PHYTA. Liddell, C.M. Parke, J.L. St. Paul, Minn. : American Phytopathological Society. Root colonization by an introduced strain of Pseudomonas fluorescens was examined to determine the importance of the root apex in passive transport and to quantify the effect of infiltrating water on distribution of the bacterium. Pea seeds coated with strain PRA25rif of P. fluorescens were sown in columns containing a sand field soil at soil-water matric potentials of -1,-6, or -10 kPa. After 7 days, the largest population density of the bacterium was found on roots at -1 kPa, but the bacterium was detected on only 5% of root segments 4-5 cm below the seed, approximately 8 cm above the root apex. At -6 and -10 kPa, the bacterium could not be detected on roots beyond 3 cm from the seed, more than 16 cm from the root apex. Addition of 27.2 and 54.4 mm of water to the top of the columns 4 days after planting increased the depth from which PRArif was recovered. The bacterium was detected on root segments at least 9-10 cm from the seed 24 hr after water was applied. Transport of the bacterium on the root apex apparently was limited to a short period after seed germination, but the bacterium was carried long distances by percolating water. Phytopathology. Dec 1989. v. 79 (12). p. 1327-1332. Includes references. (NAL Call No.: DNAL 464.8 P56).

0792

Pest control in commercial pea production.
Stevenson, W.R. Wedberg, J.L.; Doersch, R.E.; Harvey, R.G. Madison, Wis. : The Programs. Publication - Cooperative Extension Programs. University of Wisconsin - Extension. Jan 1985. (A3316). 8 p. ill. (NAL Call No.: DNAL S544.3.W6W53).

0793

Pest control in commercial snap bean production.
Binning, L.K. Wyman, J.A.; Stevenson, W.R. Madison, Wis. : The Programs. Publication - Cooperative Extension Programs. University of Wisconsin - Extension. Jan 1985. (A2329). 8 p. ill. (NAL Call No.: DNAL S544.3.W6W53).

0794

Plant defense gene regulation.
Lamb, C.J. Dron, M.; Clouse, S.D.; Dixon, R.A. Lawton, M.A. Cold Spring Harbor, N.Y. : Cold Spring Harbor Laboratory, 1988. Genetic improvements of agriculturally important crops : progress and issues / edited by Robert T. Fraley, Nicholas M. Frey, Jeff Schell. p. 31-35. ill. Includes references. (NAL Call No. DNAL QK981.5.G464).

0795

Plant pathology fact sheet: Diseases of Southern peas.
Gay, J.D. Athens, Ga. : The Service. Leaflet - Cooperative Extension Service, University of Georgia. May 1985. (377). 4 p. ill. (NAL Call No.: DNAL 275.29 G29L).

0796

Plant pathology fact sheet: snap bean diseases.
Gay, J.D. Athens, Ga. : The Service. Leaflet - Cooperative Extension Service, University of Georgia. June 1985. (114,rev.). 6 p. ill. (NAL Call No.: DNAL 275.29 G29L).

0797

Rapid transient induction of phenylalanine ammonia-lyase mRNA in elicitor-treated bean cells.
PNASA. Edwards, K. Cramer, C.L.; Bolwell, G.P.; Dixon, R.A.; Schuch, W.; Lamb, C.J. Washington, D.C. : The Academy. Proceedings of the National Academy of Sciences of the United States of America. Oct 1985. v. 82 (20). p. 6731-6735. ill. Includes 44 references. (NAL Call No.: DNAL 500 N21P).

0798

Activation of defense genes in response to elicitor and infection.
Lamb, C.J. Bell, J.N.; Corbin, D.R.; Lawton, M.A.; Mehdy, M.C.; Ryder, T.B.; Sauer, N.; Walter, M.H. New York, N.Y. : Alan R. Liss. UCLA symposia on molecular and cellular biology. In the series analytic: Molecular Strategies for Crop Protection / edited by Charles J. Arntzen and Clarence Ryan. Proceedings of a Symposium held Mar 30-Apr 6, 1986, Steamboat Springs, Colorado. 1987. v. 48. p. 49-58. Includes references. (NAL Call No.: DNAL QH506.U34).

0799

Adaptation of pathogenic fungi to toxic chemical barriers in plants: the pisatin demethylase of Nectria haematococca as an example.
VanEtten, H.D. Matthews, D.E.; Mackintosh, S.F. New York, N.Y. : Alan R. Liss. UCLA symposia on molecular and cellular biology. In the series analytic: Molecular Strategies for Crop Protection / edited by Charles J. Arntzen and Clarence Ryan. Proceedings of a Symposium held Mar 30-Apr 6, 1986, Steamboat Springs, Colorado. 1987. v. 48. p. 59-70. Includes references. (NAL Call No.: DNAL QH506.U34).

0800

Additions to host range of Colletotrichum gloeosporioides f. sp. aeschynomene.
PLDIDE. TeBeest, D.O. St. Paul, Minn. : American Phytopathological Society. Plant disease. Jan 1988. v. 72 (1). p. 16-18. ill. Includes references. (NAL Call No.: DNAL 1.9 P69P).

0801

Aerial dispersal of clusters of spores.
Ferrandino, F.J. Aylor, D.E. Boston : The Society, 1985. 17th Conference on Agricultural and Forest Meteorology and seventh Conference on Biometeorology and Aerobiology, May 21-24, 1985, Scottsdale, Ariz. : preprint volume / sponsored by the American Meteorological Society. p. 298-299. Includes references. (NAL Call No.: DNAL S600.2.C6 1985).

0802

Angular leaf spot of red kidney beans in Michigan.
PLDIDE. Correa, F.J. Saettler, A.W. St. Paul, Minn. : American Phytopathological Society. Plant disease. Oct 1987. v. 71 (10). p. 915-918. Includes references. (NAL Call No.: DNAL 1.9 P69P).

0803

Antifungal hydrolases in pea tissue. II. Inhibition of fungal growth by combinations of chitinase and beta-1,3-glucanase.
PLPHA. Mauch, F. Mauch-Mani, B.; Boller, T. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Nov 1988. v. 88 (3). p. 936-942. ill. Includes references. (NAL Call No.: DNAL 450 P692).

0804

Bean root rot unaffected by herbicides in a crop rotation system.
Gilbertson, R.L. Ruppel, E.G.; Schweizer, E.E. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. Mar 1986. v. 29. p. 26-27. (NAL Call No.: DNAL SB327.A1B5).

0805

Biocontrol of bean rust by Bacillus subtilis under field conditions.
PLDRA. Baker, C.J. Stavely, J.R.; Mock, N. St. Paul, Minn. : American Phytopathological Society. Plant disease. Sept 1985. v. 69 (9). p. 770-772. Includes 17 references. (NAL Call No.: DNAL 1.9 P69P).

0806

Biological control of grey mold of snap beans by Trichoderma hamatum.
PLDIDE. Nelson, M.E. Powelson, M.L. St. Paul, Minn. : American Phytopathological Society. Plant disease. Aug 1988. v. 72 (8). p. 727-729. Includes references. (NAL Call No.: DNAL 1.9 P69P).

0807

Chemically induced appressoria in Uromyces appendiculatus are formed aerially, apart from the substrate.
MYCOAE. Hoch, H.C. Staples, R.C.; Bourett, T. Bronx, N.Y. : The New York Botanical Garden. Mycologia. May/June 1987. v. 79 (3). p. 418-424. ill. Includes references. (NAL Call No.: DNAL 450 M99).

0808

A computer-based decision aid for managing bean rust.
Meronuck, R.A. St. Paul, Minn. : APS Press, c1987. Crop loss assessment and pest management / edited by P.S. Teng. p. 242-250. Includes references. (NAL Call No.: DNAL SB950.C77).

0809

Control of bean anthracnose caused by the delta and lambda races of Colletotrichum lindemuthianum in Canada.
PLDIDE. Tu, J.C. St. Paul, Minn. : American Phytopathological Society. Plant disease. Jan 1988. v. 72 (1). p. 5-8. Includes references. (NAL Call No.: DNAL 1.9 P69P).

0810

Control of plant diseases by chitinase expressed from cloned DNA in Escherichia coli.
PHYTA. Shapira, R. Ordentlich, A.; Chet, I.; Oppenheim, A.B. St. Paul, Minn. : American Phytopathological Society. A DNA fragment carrying the chiA gene from Serratia marcescens was subcloned into the plasmid pBR322. The resulting plasmid, pCHIA, includes a 2-kilobase-pair segment upstream of the chia gene and presumably carries the gene regulatory elements. To obtain high levels of chitinase expression, we introduced the leftward operator promoter of bacteriophage lambda, oLpL, upstream of the chia gene. The resulting plasmid, pLCHIA was introduced into cells of Escherichia coli. High levels of chitinase were produced and secreted following induction, and the enzyme was partially purified. When Sclerotium rolfsii was sprayed with partially purified chitinase produced by the cloned gene described above, rapid and extensive bursting of the hyphal tips was observed. This chitinase preparation was found to be effective in reduction of disease incidence caused by S. rolfsii in beans and Rhizoctonia solani in cotton under greenhouse conditions (62% disease reduction in both diseases). A similar effect was obtained when we used viable cells of E coli containing the plasmid pLCHIA. However, E coli carrying the plasmid lacking the pL promotor did not have any effect. These results suggest a role for chitinase in biological control of plant pathogenic fungi. Phytopathology. Nov 1989. v. 79 (11). p. 1246-1249. ill. Includes references. (NAL Call No.: DNAL 464.8 P56).

0811

Crop residue management and pea root rot disease.
Wilkins, D.E. Kraft, J.M. St. Joseph, Mich. : The Society. American Society of Agricultural Engineers (Microfiche collection). Paper presented at the 1987 Winter Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St. Joseph, Michigan 49085. Telephone the Order Dept. at (616) 429-0300 for information and prices. 1987. (fiche no. 87-2510). 13 p. Includes references. (NAL Call No.: DNAL FICHE S-72).

0812

Cyclic AMP, cyclic GMP, and bean rust uredospore germlings.
EXMYD. Epstein, L. Staples, R.C.; Hoch, H.C. Duluth, Minn. : Academic Press. Experimental mycology. Mar 1989. v. 13 (1). p. 100-104. ill. Includes references. (NAL Call No.: DNAL QK600.E9).

0813

Determination of yield loss caused by rust (Uromyces phaseoli (Reben) Wint.) in common bean (Phaseolus vulgaris L) in Puerto Rico.
Velez-Martinez, H. Lopez-Rosa, J.; Freytag, G.F. Fort Collins, Colo : Howard F. Schwartz, Colorado State University. Annual report of the Bean Improvement Cooperative. 1989. v. 32. p. 134-135. Includes references. (NAL Call No.: DNAL SB327.A1B5).

0814

Development of bean rust epidemics in a field planted with alternate rows of a resistant and a susceptible snap bean cultivar.
PHYTAJ. Aylor, D.E. St. Paul, Minn. : American Phytopathological Society. In 1986 and 1987, half of a 0.4-ha field was planted with a cultivar of bean plants susceptible to Race 38 of the bean rust pathogen Uromyces appendiculatus. In the remaining half of the field, every other row was planted with the same susceptible cultivar alternating with a resistant cultivar on which no pustules were produced. The middle row of the susceptible cultivar in each half of the field was inoculated approximately 15 days after planting. On subsequent dates, counts of pustules on plants from rows equidistant from the inoculated row in the two halves of the field were compared. Generally, there were fewer pustules per plant in the half of the field with the two cultivars in alternating rows than in the half with only the susceptible cultivar. In 1986, the cumulative number of pustule days per plant in the alternating planting was about 30% less than in the half planted entirely to the susceptible cultivar. In 1987, this difference was about 6% less. The relatively small effect of the alternate row planting in reducing bean rust was probably a result of high rates of self-infection of plants. Dispersal gradients for urediniospores of U. appendiculatus are initially very steep and include a long, relatively flat tail, characteristic of a power law. Such a dispersal gradient not only allows plants far from a disease focus to become infected, but also strongly favors self-infection of susceptible plants. As bean plants grew and filled the space between rows, spores produced on lower leaves probably were even more likely to be deposited on the plant on which they were produced than to be carried to other plants. As a consequence, a small initial benefit of the alternate planting tended to decline with increasing number of generations of the pathogen. Phytopathology. Sept 1988. v. 78 (9).

p. 1210-1215. maps. Includes references. (NAL Call No.: DNAL 464.8 P56).

0815

Disease problems on dry peas, lentils, chickpeas and faba beans.
Kaiser, W.J. St. Paul, Minn. : Center for Alternative Crops and Products, University of Minnesota, 1987? . Grain legumes as alternative crops : a symposium / sponsored by the Center for Alternative Crops and Products, University of Minnesota, July 23-24, 1987. p. 157-174. Includes references. (NAL Call No.: DNAL SB317.L43G73).

0816

Disease resistance response genes in plants: expression and proposed mechanisms of induction.
Kendra, D.F. Fristensky, B.; Daniels, C.H.; Hadwiger, L.A. New York, N.Y. : Alan R. Liss. UCLA symposia on molecular and cellular biology. In the series analytic: Molecular Strategies for Crop Protection / edited by Charles J. Arntzen and Clarence Ryan. Proceedings of a Symposium held Mar 30-Apr 6, 1986, Steamboat Springs, Colorado. 1987. v. 48. p. 13-24. ill. Includes references. (NAL Call No.: DNAL QH506.U34).

0817

The effect of added nitrogen on biomass and the incidence of white mold from two on-farm research trials. 1988.
Nuland, D. Schild, J.; Anderson, F. Fort Collins, Colo : Howard F. Schwartz, Colorado State University. Annual report of the Bean Improvement Cooperative. 1989. v. 32. p. 109-110. (NAL Call No.: DNAL SB327.A1B5).

0818

The effect of chelating agents on a rust fungus developing on induced resistant plants.
NASSD. Alten, H. von. Schonbeck, F. New York, N.Y. : Plenum Press. NATO advanced science institutes series : Series A : Life sciences. In the series analytic: Iron, siderophores, and plant diseases / edited by T.R. Swinburne. Paper presented at the "NATO Advanced Research Workshop," July 1-5, 1985, Wye, Kent, England. 1986. v. 117. p. 243-247. Includes references. (NAL Call No.: DNAL QH301.N32).

0819

Effect of fungal death or inhibition induced by oxycarboxin or polyoxin D on the interaction between resistant or susceptible bean cultivars and the bean rust fungus.
PHYTAJ. Heath, M.C. St. Paul, Minn. : American Phytopathological Society. Light and electron microscopy of resistant or susceptible bean leaves inoculated with the bean rust fungus and then treated with the fungicide oxycarboxin or the chitin synthesis inhibitor polyoxin D confirmed that the typical plant response to the dead fungus is the encasement of haustoria in the absence of plant cell necrosis. In the untreated resistant cultivar, necrosis commonly was detected first in cells adjacent to those containing haustoria at about 2 days after inoculation; the chemicals inhibited such necrosis if applied 1 day after inoculation. Polyoxin D treatment at this time allowed more infection sites to develop necrotic cells than did oxycarboxin application, apparently because after treatment with the former, some haustoria remained alive and continued to grow. These results indicate that haustorium walls do not contain chitin, that only the living haustorium elicits necrosis, and that it does so a few hours after it becomes mature. Ultrastructurally, the incompatible interaction was characterized by silica deposition in plant cells next to dead ones, wide electron-opaque extrahaustorial matrices, and the widespread deposition of callose-like material along the wall of haustorium-containing cells. Polyoxin-induced fungal death in the compatible cultivar did not elicit ultrastructural features typical of the incompatible interaction except for a slight increase in electron-opaque material in the extrahaustorial matrix. Phytopathology. Nov 1988. v. 78 (11). p. 1454-1462. ill. Includes references. (NAL Call No.: DNAL 464.8 P56).

0820

The effect of fungicide formulation, rate, and timing in control of bean rust in southwest Nebraska.
Lindgren, D.T. Steadman, J.R. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. Mar 1985. v. 28. p. 19-20. (NAL Call No.: DNAL SB327.A1B5).

0821

Effect of fungicide seed treatment and Rhizobium inoculation on chickpea production.
AAREEZ. Welty, L.E. Prestbye, L.S.; Hall, J.A.; Mathre, D.E.; Ditterline, R.L. New York : Springer. Applied agricultural research. 1988. v. 3 (1). p. 17-20. Includes references. (NAL Call No.: DNAL S539.5.A77).

0822

Effect of host genotype unit area on development of focal epidemics of bean rust and common maize rust in mixtures of resistant and susceptible plants.
PHYTAJ. Mundt, C.C. Leonard, K.J. St. Paul, Minn. : American Phytopathological Society. Phytopathology. Sept 1986. v. 76 (9). p. 895-900. Includes references. (NAL Call No.: DNAL 464.8 P56).

0823

The effect of iron and boron amendments on infection of bean by Fusarium solani.
PHYTA. Guerra, D. Anderson, A.J. St. Paul, Minn. : American Phytopathological Society. Phytopathology. Sept 1985. v. 75 (9). p. 989-991. Includes 10 references. (NAL Call No.: DNAL 464.8 P56).

0824

Effect of irrigation regimes on susceptibility of bean to Macrophomina phaseolina.
JRGVA. Diaz-Franco, A. Cortinas Escobar, H. Weslaco, Tex. : The Society. Journal of the Rio Grande Valley Horticultural Society. This publication is not owned by the National Agricultural Library. 1988. v. 41. p. 47-50. Includes references. (NAL Call No.: DNAL 81 L95).

0825

The effect of leaf developmental stage on the variation of resistant and susceptible reactions of phaseolus vulgaris to Uromyces appendiculatus.
PHYTA. Shaik, M. Steadman, J.R. St. Paul, Minn. : American Phytopathological Society. The effect of leaf developmental stage of beans (Phaseolus vulgaris) at the time of inoculation on the expression of various reactions to rust (Uromyces appendiculatus) was investigated. The areas of uredinia, fungal colonies, and secondary uredinia were negatively correlated with leaf age or leaf length at the time of inoculation, in the most susceptible reaction (large uredinia). These three susceptibility parameters were all positively correlated with each other. In the reaction of smaller uredinia surrounded by necrosis, the percentage of uredinia surrounded by necrosis and fungal colony areas were negatively correlated, whereas uredinial area was positively correlated with leaf developmental stage at the time of inoculation. The effect of leaf developmental stage on uredinial area in this reaction was thus the opposite of that observed for large uredinia. However, the covariate (leaf age)-adjusted means of uredinial and fungal colony areas were significantly lower in the smaller uredinial reaction than those in the large uredinial reaction. In highly resistant reactions (immunity and necrotic spots), leaf age effects were not apparent. Based on these results, several recommendations are made for studying resistance manifested by small uredinia. Phytopathology. Oct 1989. v. 79 (10). p. 1028-1035. ill. Includes references. (NAL Call No.: DNAL 464.8 P56).

0826

Effect of nitrogen fertilizers and fungicides on white mold disease and yield of pinto beans in North Dakota.
PNDAAZ. Venette, J.R. Albaugh, D.A.; Kemp, S.W. Grand Forks, N.D. : The Academy. Proceedings of the North Dakota Academy of Science. Apr 1985. v. 39. p. 35. Includes references. (NAL Call No.: DNAL 500 N813).

0827

Effect of potassium on sugar uptake and assimilation by bean rust germlings.
MYCOAE. Staples, R.C. Hassouna, S.; Hoch, H.C. Bronx, N.Y. : The New York Botanical Garden. Mycologia. Mar/Apr 1985. v. 77 (2). p. 248-252. Includes references. (NAL Call No.: DNAL 450 M99).

0828

Effect of rate and time of application of Ronilan on control of gray mold on snap beans, 1984.
FNETD. Kerssies, A. Hunter, J.E. s.l. : The Society. Fungicide and nematicide tests : results - American Phytopathological Society. 1985. v. 40. p. 64. (NAL Call No.: DNAL 464.9 AM31R).

0829

Effectiveness of fungicides as seed treatment for bean root rot control under greenhouse conditions, 1983.
FNETD. Abawi, G.S. Cobb, A.C. s.l. : The Society. Fungicide and nematicide tests : results - American Phytopathological Society. 1985. v. 40. p. 169. (NAL Call No.: DNAL 464.9 AM31R).

0830

Effects of elicitors on plant membrane functions.
Rogers, K. Anderson, A.J. New York : Alan R. Liss. UCLA symposia on molecular and cellular biology. In the series analytic: Plant membranes: structure, function, biogenesis / edited by C. Leaver and H. Sze. Proceedings of a Symposium, February 8-13, 1987, Park City, Utah. 1987. v. 63. p. 403-418. Includes references. (NAL Call No.: DNAL QH506.U34).

0831

Effects of genotype, plant spacing and intercropping with sorghum on ashy stem blight of cowpeas.
Conniff, K. De Mooy, C.J.; Burke, D.W. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. Mar 1986. v. 29. p. 97. (NAL Call No.: DNAL SB327.A1B5).

0832

Effects of herbicides on root rot of pinto bean, weeds, and two soilborne fungi.
PLDRA. Gilbertson, R.L. Ruppel, E.G.; Schweizer, E.E. St. Paul, Minn. : American Phytopathological Society. Plant disease. July 1987. v. 71 (7). p. 627-629. Includes references. (NAL Call No.: DNAL 1.9 P69P).

0833

Effects of inoculum density and placement on Fusarium root rot of peas.
PHYTAJ. Rush, C.M. Kraft, J.M. St. Paul, Minn. : American Phytopathological Society. Phytopathology. Dec 1986. v. 76 (12). p. 1325-1329. Includes 27 references. (NAL Call No.: DNAL 464.8 P56).

0834

Effects of inoculum level of Rhizoctonia solani on emergence, plant development, and yield of dry beans.
PHYTAJ. Van Bruggen, A.H.C. Whalen, C.H.; Arneson, P.A. St. Paul, Minn. : American Phytopathological Society. Phytopathology. Sept 1986. v. 76 (9). p. 869-873. Includes references. (NAL Call No.: DNAL 464.8 P56).

0835

Effects of new fungicides on snap bean pod rot control.
Mullins, C.A. Fort Collins, Colo : Howard F. Schwartz, Colorado State University. Annual report of the Bean Improvement Cooperative. 1989. v. 32. p. 119-120. (NAL Call No.: DNAL SB327.A1B5).

0836

The effects of pathogen numbers and tillage on root disease severity, root length, and seed yields in green peas.
PLDIDE. Kraft, J.M. Wilkins, D.E. St. Paul, Minn. : American Phytopathological Society. Plant disease. Nov 1989. v. 73 (11). p. 884-887. Includes references. (NAL Call No.: DNAL 1.9 P69P).

0837

Effects of sulfur dioxide exposure on the development of common blight in field-grown red kidney beans.
PHYTAJ. Reynolds, K.L. Zanelli, M.; Laurence, J.A. St. Paul, Minn. : American Phytopathological Society. Phytopathology. Feb 1987. v. 77 (2). p. 331-334. Includes references. (NAL Call No.: DNAL 464.8 P56).

0838

Effects of wheat chaff and tillage on inoculum density of Pythium ultimum in the Pacific Northwest.
PHYTAJ. Rush, C.M. Ramig, R.E.; Kraft, J.M. St. Paul, Minn. : American Phytopathological Society. Phytopathology. Dec 1986. v. 76 (12). p. 1330-1332. Includes 23 references. (NAL Call No.: DNAL 464.8 P56).

0839

Efficacy of pencycuron against isolates representing different anastomosis groups of Rhizoctonia solani and Rhizoctonia-like binucleate fungi.
PLDRA. Sumner, D.R. St. Paul, Minn. : American Phytopathological Society. Plant disease. June 1987. v. 71 (6). p. 515-518. Includes references. (NAL Call No.: DNAL 1.9 P69P).

0840

Evaluation of a new fungicide for control of bean rust.
Lindgren, D.T. Steadman, J.R. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1987. v. 30. p. 48-49. (NAL Call No.: DNAL SB327.A1B5).

0841

Evaluation of fungicide seed treatments for control of root rot in peas, 1985.
FNETD. Mulrooney, R.P. Ford, H.F. s.l. : The Society. Fungicide and nematicide tests : results - American Phytopathological Society. 1986. v. 41. p. 133-134. (NAL Call No.: DNAL 464.9 AM31R).

0842

Evaluation of fungicide treatments for control of snap bean rust.
TFHSA. Mullins, C.A. Hilty, J.W. Knoxville, Tenn. : The Station. Tennessee farm and home science - Tennessee Agricultural Experiment Station. July/Sept 1985. (135). p. 9-10. Includes 6 references. (NAL Call No.: DNAL 100 T25F).

0843

Evaluation of fungicides for control of snap bean rust in Tennessee.
Mullins, C.A. Hilty, J.W. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. Mar 1985. v. 28. p. 109-110. (NAL Call No.: DNAL SB327.A1B5).

0844

Field evaluation of selected fungicides for control of bean root rot, 1985.
FNETD. Abawi, G.S. Crosier, D.C. s.l. : The Society. Fungicide and nematicide tests : results - American Phytopathological Society. 1986. v. 41. p. 126. (NAL Call No.: DNAL 464.9 AM31R).

0845

Field evaluation of selected fungicides for control of pea root rot, 1985.
FNETD. Dillard, H.R. Abawi, G.S. s.l. : The Society. Fungicide and nematicide tests : results - American Phytopathological Society. 1986. v. 41. p. 133. (NAL Call No.: DNAL 464.9 AM31R).

0846

Field measurement of white mold effects upon dry beans with genetic resistance or upright plant architecture.
CRPSAY. Schwartz, H.F. Casciano, D.H.; Asenga, J.A.; Wood, D.R. Madison, Wis. : Crop Science Society of America. Crop science. July/Aug 1987. v. 27 (4). p. 699-702. Includes references. (NAL Call No.: DNAL 64.8 C883).

0847

Fungicide control of snapbean rust, 1984.
FNETD. Hilty, J.W. Mullins, C.A. s.l. : The Society. Fungicide and nematicide tests : results - American Phytopathological Society. 1985. v. 40. p. 64. (NAL Call No.: DNAL 464.9 AM31R).

0848

Fungicide evaluation for control of white mold of snap beans, 1984.
FNETD. Apple, J.D. Powelson, M.L. s.l. : The Society. Fungicide and nematicide tests : results - American Phytopathological Society. 1985. v. 40. p. 63. (NAL Call No.: DNAL 464.9 AM31R).

0849

Fusarium wilt suppression and agglutinability of Pseudomonas putida.
APMBA. Tari, P.H. Anderson, A.J. Washington, D.C. : American Society for Microbiology. Mutants of Pseudomonas putida (Agg-) that lack the ability to agglutinate with components present in washes of bean and cucumber roots showed limited potential to protect cucumber plants against Fusarium oxysporum f. sp. cucumerinum. However, a higher level of protection was observed against Fusarium wilt in cucumber plants coinoculated with the parental bacterium (Agg+), which was agglutinable. The Agg- mutants did not colonize the roots of cucumber plants as extensively as the Agg+ parental isolate did. In competition experiments involving bean roots inoculated with a mixture of Agg+ and Agg- bacteria, the Agg+ strains colonized roots to a greater extent than the Agg- cells did. These data suggest that the Agg+ phenotype provi des additional interactions that aid in the beneficial character of P. putida. Applied and environmental microbiology. Aug 1988. v. 54 (8). p. 2037-2041. Includes references. (NAL Call No.: DNAL 448.3 AP5).

0850

FUungicide treatment of bean seed to control charcoal rot.
Diaz Franco, A. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1988. v. 31. p. 123-124. Includes references. (NAL Call No.: DNAL SB327.A1B5)

0851

Genetic and cultural of Fusarium root rot in bush snap beans.
PLDIDE. Silbernagel, M.J. Mills, L.J. St. Paul, Minn. : American Phytopathological Society. Plant disease. Jan 1990. v. 74 (1). p. 61-66. Includes references. (NAL Call No.: DNAL 1.9 P69P).

0852

Greenhouse evaluation of fungicides as seed and soil treatments for bean root rot control, 1985.
FNETD. Abawi, G.S. Crosier, D.C. s.l. : The Society. Fungicide and nematicide tests : results - American Phytopathological Society. 1986. v. 41. p. 125. (NAL Call No.: DNAL 464.9 AM31R).

0853

Host-pathogen interactions, XXXIII. A plant protein converts a fungal pathogenesis factor into an elicitor of plant defense responses.
PLPHA. Cervone, F. Hahn, M.G.; De Lorenzo, G.; Darvill, A.; Albersheim, P. Rockville, Md. : American Society of Plant Physiologists. This paper describes the effect of a plant-derived polygalacturonase-inhibiting protein (PGIP) on the activity of endopolygalacturonases isolated from fungi. PGIP's effect on endopolygalacturonases is to enhance the production of oligogalacturonides that are active as elicitors of phytoalexin (antibiotic) accumulation and other defense reactions in plants. Only oligogalacturonides with a degree of polymerization higher than nine are able to elicit phytoalexin synthesis in soybean cotyledons. In the absence of PGIP, a 1-minute exposure of polygalacturonic acid to endopolygalacturonase resulted in the production of elicitor-active oligogalacturonides. However, the enzyme depolymerized essentially all of the polygalacturonic acid substrate to elicitor-inactive oligogalacturonides within 15 minutes. When the digestion of polygalacturonic acid was carried out with the same amount of enzyme but in the presence of excess PGIP, the rate of production of elicitor-active oligogalacturonides was dramatically altered. The amount of elicitor-active oligogalacturonide steadily increased for 24 hours. It was only after about 48 hours that the enzyme converted the polygalacturonic acid into short, elicitor-inactive oligomers. PGIP is a specific, reversible, saturable, high-affinity receptor for endopolygalacturonase. Formation of the PGIP-endopolygalacturonase complex results in increased concentrations of oligogalacturonides that activate plant defense responses. The interactionof the plant-derived PGIP with fungal endopolygalacturonases may be a mechanism by which plants convert endopolygalacturonase, a factor important for the virulence of pathogens, into a factor that elicits plant defense mechanisms. Plant physiology. June 1989. v. 90 (2). p. 542-548. (NAL Call No.: DNAL 450 P692).

0854

Identification of in vitro resistance of pigeon peas Cajanus cajan (L.) **Millsp. to Phytophthora stem canker.**
JAUPA. Rodriguez, R. Melendez, P.L. Mayaguez : University of Puerto Rico, Agricultural Experiment Station. The Journal of agriculture of the University of Puerto Rico. Jan 1985. v. 69 (1). p. 11-17. ill. Includes references. (NAL Call No.: DNAL 8 P832J).

0855

Immunochemical relatedness of fungal NADPH-cytochrome P-450 reductases and their ability to reconstitute pisatin demethylase activity.
EXMYD. Scala, F. Matthews, D.; Costa, M.; VanEtten, H.D. Duluth, Minn. : Academic Press. Experimental mycology. Dec 1988. v. 12 (4). p. 377-385. ill. Includes references. (NAL Call No.: DNAL QK600.E9).

0856

In vitro Rhizobium strains evaluation for biocontrol of Macrophomina phaseolina.
Perdomo, F. Echavez-Badel, R.; Alameda, M.; Schroder, E.C. Fort Collins, Colo : Howard F. Schwartz, Colorado State University. Annual report of the Bean Improvement Cooperative. 1989. v. 32. p. 103-104. Includes references. (NAL Call No.: DNAL SB327.A1B5).

0857

Incorporation of crucifer green manures to reduce Aphanomyces root rot of snap beans.
Parke, J.L. Rand, R.E. Fort Collins, Colo : Howard F. Schwartz, Colorado State University. Annual report of the Bean Improvement Cooperative. 1989. v. 32. p. 105-106. Includes references. (NAL Call No.: DNAL SB327.A1B5).

0858

Inheritance of resistance to two races of fusarium wilt in three cowpea cultivars.
CRPSAY. Rigert, K.S. Foster, K.W. Madison, Wis. : Crop Science Society of America. Fusarium wilt caused by Fusarium oxysporum f. sp. tracheiphilum (E.F.Sm.) Snyder and Hansen is a serious disease of cowpea Vigna unguiculata (L.) Walp. in California. The objectives of this study were to determine the inheritance of resistance to F. oxysporum f. sp. tracheiphilum races 2 and 3 in 'California Blackeye Number Five' (CB5),''California Blackeye Number Three' (CB3), and line 7964, and to determine if the genes for resistance to each race were independent of each other. Cultivar CB5 is susceptible and CB3 and 7964 are resistant to races 2 and 3. The F1, BC1, F2, and F5, progenies were evaluated for resistance to each race using a seedling root dip inoculation procedure. Some F1 and F2 progenies were also evaluated for resistance using a tray inoculation procedure. A single dominant race 3 resistance gene was identified in CB3 and a single dominant race 2 resistance gene was identified in 7964. The F3 family reaction to both races suggested that the race 3 gene in CB3 also conferred incompletely dominant resistance to race 2, and the race 2 gene in 7964 also conferred incompletely dominant resistance to race 3. The reaction of F5 lines to both races did not support this hypothesis. It was concluded that CB3 also possessed a single incompletely dominant gene for race 2

resistance and that 7964 also possessed a single incompletely dominant gene for race 3 resistance. Crop science. Mar/Apr 1987. v. 27 (2). p. 220-224. Includes references. (NAL Call No.: DNAL 64.8 C883).

0859

Integrated control of the pea root rot disease complex in Ontario.
PLDRA. Tu, J.C. St. Paul, Minn. : American Phytopathological Society. Plant disease. Jan 1987. v. 71 (1). p. 9-13. ill. Includes references. (NAL Call No.: DNAL 1.9 P69P).

0860

Interaction of genetic resistance to fusarium root rot with cultural practices in a white-seeded bush snap bean.
Silbernagel, M.J. Doyle, T.J. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. Mar 1985. v. 28. p. 1-2. (NAL Call No.: DNAL SB327.A1B5).

0861

Interpretation and measurement of leaf wetness in a row crop.
Weiss, A. Lukens, D.L.; Steadman, J.R. Boston : The Society, 1985. 17th Conference on Agricultural and Forest Meteorology and seventh Conference on Biometeorology and Aerobiology, May 21-24, 1985, Scottsdale, Ariz. : preprint volume / sponsored by the American Meteorological Society. p. 60. Includes references. (NAL Call No.: DNAL S600.2.C6 1985).

0862

Isolation of coumarin in snap beans and its effect on uredospore germination.
JAFCAU. Meredith, F.I. Thomas, C.A.; Horvat, R.J. Washington, D.C. : American Chemical Society. Journal of agricultural and food chemistry. May/June 1986. v. 34 (3). p. 456-458. Includes references. (NAL Call No.: DNAL 381 J8223).

0863

Kinetic studies on the control of the bean rust fungus (Uromyces phaseoli L.) by an inhibitor of polyamine biosynthesis.
PLPHA. Rajam, M.V. Weinstein, L.H.; Galston, A.W. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Oct 1986. v. 82 (2). p. 485-487. ill. Includes references. (NAL Call No.: DNAL 450 P692).

0864

Measuring the effect of rust on pinto beans.
Lindgren, D.T. Steadman, J.R.; Schaaf, D.M. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1988. v. 31. p. 100-101. (NAL Call No.: DNAL SB327.A1B5).

0865

Mechanism of biological control of preemergence damping-off of pea by seed treatment with Trichoderma spp.
PHYTAJ. Lifshitz, R. Windham, M.T.; Baker, R. St. Paul, Minn. : American Phytopathological Society. Phytopathology. July 1986. v. 76 (7). p. 720-725. ill. Includes 43 references. (NAL Call No.: DNAL 464.8 P56).

0866

Medium for the isolation of Pseudomonas cepacia biotype from soil and the isolated biotype.
Lunmsden, R.D. Sasser, M. Washington, D.C.? : The Department. Abstract: A new biotype, SDL-POP-S-1, of the soilborne beneficial bacterium Pseudomonas cepacia NRRL B-14149 has been discovered. The biotype is very effective in controlling Pythium diseases of cucumbers and peas. A new medium that is exclusively selective for the bacterium Pseudomonas cepacia has also been developed. United States Department of Agriculture patents. Copies of USDA patents are available for a fee from the Commissioner of Patents and Trademarks, U.S. Patents and Trademarks Office, Washington. D.C. 20231. May 13, 1986. (4,588,584). 1 p. Includes references. (NAL Call No.: DNAL aT223.V4A4).

0867

Nature of protection of bean seedlings from Rhizoctonia root rot by a binucleate Rhizoctonia-like fungus.
PHYTAJ. Cardoso, J.E. Echandi, E. St. Paul, Minn. : American Phytopathological Society. Phytopathology. Nov 1987. v. 77 (11). p. 1548-1551. ill. Includes references. (NAL Call No.: DNAL 464.8 P56).

0868

Partial resistance to Uromyces appendiculatus in dry edible beans.
PHYTAJ. Statler, G.D. McVey, M.A. St. Paul, Minn. : American Phytopathological Society. Phytopathology. July 1987. v. 77 (7). p. 1101-1103. Includes references. (NAL Call No.: DNAL 464.8 P56).

0869

Path coefficient analysis of effects of Rhizoctonia solani on growth and development of dry beans.
PHYTAJ. Van Bruggen, A.H.C. Arneson, P.A. St. Paul, Minn. : American Phytopathological Society. Phytopathology. Sept 1986. v. 76 (9). p. 874-878. Includes references. (NAL Call No.: DNAL 464.8 P56).

0870

Pathogenic variability, resistance sources, and progress towards developing stable resistance to bean rust.
Stavely, J.R. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. Mar 1986. v. 29. p. 24-25. Includes references. (NAL Call No.: DNAL SB327.A1B5).

0871

Pea saponins in the pea--Fusarium solani interaction.
EXMYD. Christian, D.A. Hadwiger, L.A. Duluth, Minn. : Academic Press. Experimental mycology. Dec 1989. v. 13 (4). p. 419-427. Includes references. (NAL Call No.: DNAL QK600.E9).

0872

Persistence of the fungicide vinclozolin on pea leaves under laboratory conditions.
JAFCAU. Szeto, S.Y. Burlinson, N.E.; Rahe, J.E.; Oloffs, P.C. Washington, D.C. : American Chemical Society. Journal of agricultural and food chemistry. Mar/Apr 1989. 37 (2). p. 529-534. Includes references. (NAL Call No.: DNAL 381 J8223).

0873

Phytotoxin production by Diaporthe phaseolorum var. caulivora, the causal organism of stem canker of soybean.
PHYTA. Lalitha, B. Snow, J.P.; Berggren, G.T. St. Paul, Minn. : American Phytopathological Society. Diaporthe phaseolorum var. caulivora isolated from soybean plants infected with stem canker produces a toxin that caused symptoms characteristic of stem canker when introduced into the plant. The amount of toxin and the degree of symptoms were linearly related. Four fungal isolates produced the toxin in culture in significantly different amounts, when measured in terms of the degree of symptoms and the dilution end point. The amount of toxin produced by the isolates correlated with the length of cankers produced by the fungus upon inoculation. Of the 12 plant species evaluated, only soybean and lima bean were sensitive to the toxin and also susceptible to the fungus. The purified toxin produced symptoms very similar to those of stem canker, and some of its chemical properties are similar to those of a phytotoxin suggested to have a role in pine wilt caused by Phomopsis sp. The D.p. caulivora toxin appears to play a role in stem canker of soybean. Phytopathology. Apr 1989. v. 79 (4). p. 499-504. Includes references. (NAL Call No.: DNAL 464.8 P56).

0874

Plant diseases: Pea wilt and pea root rots in the home garden.
WUEXA. Davidson, R.M. Jr. Byther, R.S.; Haglund, W.A. Pullman, Wash. : The Service. Extension bulletin - Washington State University, Cooperative Extension Service. Oct 1986. (1262,rev.). 2 p. (NAL Call No.: DNAL 275.29 W27P).

0875

Plant pathology fact sheet: stem anthracnose of lima beans.
Gay, J.D. Athens, Ga. : The Service. Leaflet - Cooperative Extension Service, University of Georgia. Aug 1988. (44,rev.). 4 p. ill. (NAL Call No.: DNAL 275.29 G29L).

0876

Plant pathology fact sheet: stem anthracnose of lima beans.
Gay, J.D. Athens, Ga. : The Service. Leaflet - Cooperative Extension Service, University of Georgia. Feb 1986. (44,rev.). 2 p. ill. (NAL Call No.: DNAL 275.29 G29L).

0877

Possible role of competition for nutrients in biocontrol of Pythium damping-off by bacteria.
PHYTAJ. Elad, Y. Chet, I. St. Paul, Minn. : American Phytopathological Society. Phytopathology. Feb 1987. v. 77 (2). 190-195. Includes references. (NAL Call No.: DNAL 464.8 P56).

0878

Prevention of a plant disease by specific inhibition of fungal polyamine biosynthesis.
PNASA. Rajam, M.V. Weinstein, L.H.; Galston, A.W. Washington, D.C. : The Academy. Proceedings of the National Academy of Sciences of the United States of America. Oct 1985. v. 82 (20). p. 6874-6878. ill. Includes 18 references. (NAL Call No.: DNAL 500 N21P).

0879

Purification and characterization of a polygalacturonase-inhibiting protein from Phaseolus vulgaris L.
PLPHA. Cervone, F. De Lorenzo, G.; Degra, L.; Salvi, G.; Bergami, M. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Nov 1987. v. 85 (3). p. 631-637. Includes references. (NAL Call No.: DNAL 450 P692).

0880

A quantifiable type of inoculum of Rhozoctonia solani.
PLDRA. Van Bruggen, A.H.C. Arneson, P.A. St. Paul, Minn. : American Phytopathological Society. Plant disease. Nov 1985. . v. 69 (11). p. 966-969. Includes 22 references. (NAL Call No.: DNAL 1.9 P69P).

0881

Reduction of fusarium root rot and sclerotinia wilt in beans with irrigation, tillage, and bean genotype.
PLDRA. Miller, D.E. Burke, D.W. St. Paul, Minn. : American Phytopathological Society. Plant disease. Feb 1986. v. 70 (2). p. 163-166. Includes 6 references. (NAL Call No.: DNAL 1.9 P69P)

0882

The relationship between hollow heart of pea and seed electrolyte loss, disease susceptibility, and plant growth.
PHYTAJ. Rush, C.M. St. Paul, Minn. : American Phytopathological Society. Phytopathology. Nov 1987. v. 77 (11). p. 1533-1536. ill. Includes references. (NAL Call No.: DNAL 464.8 P56).

0883

Rhizoctonia root rot in snap bean following corn with conservation tillage.
Win, H.H. Sumner, D.R. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1988. v. 31. p. 119-120. (NAL Call No.: DNAL SB327.A1B5).

0884

Rhizoctonia stem canker on beans.
CAGRA. Paulus, A.O. Brendler, R.A.; Nelson, J.; Otto, H.W. Berkeley The Station. California agriculture - California Agricultural Experiment Station. Nov/Dec 1985. v. 39 (11/12). p. 13-14. ill. (NAL Call No.: DNAL 100 C12CAG).

0885

Rhizosphere competence of Trichoderma harzianum.
PHYTAJ. Ahmad, J.S. Baker, R. St. Paul, Minn. : American Phytopathological Society. Phytopathology. Feb 1987. v. 77 (2). p. 182-189. ill. Includes references. (NAL Call No.: DNAL 464.8 P56).

0886

The role of chitinase of Serratia marcescens in biocontrol of Sclerotium rolfsii.
PHYTAJ. Ordentlich, A. Elad, Y.; Chet, I. St. Paul, Minn. : American Phytopathological Society. Phytopathology. Jan 1988. v. 78 (1). p. 84-88. ill. Includes references. (NAL Call No.: DNAL 464.8 P56).

0887

Role of oxygenases in pisatin biosynthesis and in the fungal degradation of maackiain.
PLPHA. Matthews, D.E. Weiner, E.J.; Matthews, P.S.; VanEtten, H.D. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Feb 1987. v. 83 (2). p. 365-370. Includes references. (NAL Call No.: DNAL 450 P692).

0888

Root rot induced in snap bean by Rhizoctonia solani AG-4 and AG-2 type 2 in conservation tillage following corn.
PLDIDE. Win, H.H. Sumner, D.R. St. Paul, Minn. : American Phytopathological Society. Plant disease. Dec 1988. v. 72 (12). p. 1049-1053. Includes references. (NAL Call No.: DNAL 1.9 P69P).

0889

Root rot of snap beans in New York.
NYFSB. Abawi, G.S. Crosier, D.C.; Cobb, A.C. Geneva, N.Y. : New York (State), Agricultural Experiment Station, Geneva. New York's food and life sciences bulletin. 1985. (110). 7 p. ill. (NAL Call No.: DNAL S95.E22).

0890

Seed electrolyte loss and resistance to fusarium root rot of peas.
PLDRA. Kraft, J.M. St. Paul, Minn. : American Phytopathological Society. Plant disease. Aug 1986. v. 70 (8). p. 743-745. Includes 16 references. (NAL Call No.: DNAL 1.9 P69P).

0891

Seed storage studies in field bean (Lablab purpureus (L.) sweet var. lignosus. Prain).
AOSNA. Vanangamudi, K. Karivaratharaju, T.V.; Ramakrishnan, V. S.l. : The Association. The Newsletter of the Association of Official Seed Analysts. Feb 1986. v. 60 (1). p. 78-85. Includes references. (NAL Call No.: DNAL 61.9 AS7N).

0892

Seed transmission characteristics of selected bean common mosaic virus strains in differential bean cultivars.
PLDRA. Morales, F.J. Castano, M. St. Paul, Minn. : American Phytopathological Society. Plant disease. Jan 1987. v. 71 (1). p. 51-53. Includes references. (NAL Call No.: DNAL 1.9 P69P).

0893

Seed-treatment fungicides for control of seedborne Ascochyta lentis on lentil.
PLDRA. Kaiser, W.J. Hannan, R.M. St. Paul, Minn. : American Phytopathological Society. Plant disease. Jan 1987. v. 71 (1). p. 58-62. maps. Includes references. (NAL Call No.: DNAL 1.9 P69P).

0894

Seedling diseases of vegetables in conservation tillage with soil fugicides and fluid drilling.
PLDIDE. Sumner, D.R. Ghate, S.R.; Phatak, S.C. St. Paul, Minn. : American Phytopathological Society. Plant disease. Apr 1988. v. 72 (4). p. 317-320. Includes references. (NAL Call No.: DNAL 1.9 P69P).

0895

Slow rusting in dry edible beans.
NDFRA. Statler, G.D. Grafton, K. Fargo, N.D. : The Station. North Dakota farm research - North Dakota, Agricultural Experiment Station. Jan/Feb 1988. v. 45 (4). p. 13-15. ill. Includes references. (NAL Call No.: DNAL 100 N813B).

0896

Snap bean response to new fungicides for rust control.
Mullins, C.A. Hilty, J.W. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. Mar 1986. v. 29. p. 71-72. Includes references. (NAL Call No.: DNAL SB327.A1B5).

0897

Strategies for chemical control of snap bean rust in Florida and their compatibility with Canadian residue tolerances.
PLDRA. Pohronezny, K. Francis, J.; Fong, W.G. St. Paul, Minn. : American Phytopathological Society. Plant disease. July 1987. v. 71 (7). p. 639-642. Includes references. (NAL Call No.: DNAL 1.9 P69P).

0898

Tailoring snap bean disease control to weather conditions.
Baldwin, R.E. Blacksburg, Va. : Virginia Polytechnic Inst. and State University Cooperative Ext. Service. The Vegetable grower's news. Mar/Apr 1989. v. 43 (5). p. 2. (NAL Call No.: DNAL 275.28 V52).

0899

Temperature and moisture effects upon bean rust outbreaks in Colorado during 1981-1987.
Schwartz, H.F. McMillan, M.S. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1988. v. 31. p. 102-103. (NAL Call No.: DNAL SB327.A1B5).

0900

Tissue-specific responses to infection.
Clarke, A. Howlett, B.; Imrie, B.; Irwin, J.; Kapuscinski, M.; Ralton, J.; Smart, M. New York, N.Y. : Alan R. Liss. UCLA symposia on molecular and cellular biology. In the series analytic: Molecular Strategies for Crop Protection / edited by Charles J. Arntzen and Clarence Ryan. Proceedings of a Symposium held Mar 30-Apr 6, 1986, Steamboat Springs, Colorado. 1987. v. 48. p. 35-48. ill. Includes references. (NAL Call No.: DNAL QH506.U34).

0901

The use of benomyl to control infection by vesicular-arbuscular mycorrhizal fungi.
NEPHA. Fitter, A.H. Nichols, R. New York, N.Y. : Cambridge University Press. The New phytologist. Oct 1988. v. 110 (2). p. 201-206. Includes references. (NAL Call No.: DNAL 450 N42).

0902

Use of dry inoculum to evaluate beans for resistance to anthracnose and angular leaf spot.
PLDIDE. Inglis, D.A. Hagedorn, D.J.; Rand, R.E. St. Paul, Minn. : American Phytopathological Society. Plant disease. Sept 1988. v. 72 (9). p. 771-774. Includes references. (NAL Call No.: DNAL 1.9 P69P).

0903

Use of fungicide treatments and host resistance to control the wilt and root rot complex of chickpeas.
PLDRA. Jimenez-Diaz, R.M. Trapero-Casas, A. St. Paul, Minn. : American Phytopathological Society. Plant disease. July 1985. v. 69 (7). p. 591-595. Includes 22 references. (NAL Call No.: DNAL 1.9 P69P).

0904

Variation in rust susceptibility in beans: predicting lesion size from leaf developmental stage measured by leaf age, length, and plastochron index.
PHYTA. Shaik, M. Dickinson, T.A.; Steadman, J.R. St. Paul, Minn. : American Phytopathological Society. The importance of controlling for leaf developmental stage at the time of inoculation in studies of lesion size was investigated. Significant differences were obtained between two cultivars, Pompadour Checa and Pinto 650, by regressing lesion size on leaf developmental stage at time of inoculation. Leaf developmental stage was recorded as leaf age (days from unfolding), as leaf length, and by means of a plastochron index. Of these three variables, leaf age and plastochron index were better predictors of lesion size than leaf length. Plastochron index is a superior indicator of leaf development since it integrates chronological age and increase in size and is easier to assess. The results reported here may explain certain aspects of the field resistance of Pompadour Checa. Phytopathology. Oct 1989. v. 79 (10). p. 1035-1042. Includes references. (NAL Call No.: DNAL 464.8 P56).

0905

Variation in virulence of the rust pathogen in the Dominican Republic and high plains of the U.S.: implication for control.
Steadman, J.R. Ramirez, W.; Shaik, M.; Hindman, D.; Coyne, D.P. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. Mar 1986. v. 29. p. 6. (NAL Call No.: DNAL SB327.A1B5).

0906

White mold control programs on irrigated dry beans.
Varner, G. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. Mar 1986. v. 29. p. 56-57. (NAL Call No.: DNAL SB327.A1B5).

0907

Yield losses in dry bean (Phaseolus vulgaris L.) caused by angular leaf spot (Isariopsis griseola Sacc.).
Seijas, C.A.R. Sartorato, A. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. Mar 1985. v. 28. p. 5-6. (NAL Call No.: DNAL SB327.A1B5).

0908

Antagonism of lactic acid bacteria against phytopathogenic bacteria.
APMBA. Visser, R. Holzapfel, W.H.; Bezuidenhout, J.J.; Kotze, J.M. Washington, D.C. : American Society for Microbiology. Applied and environmental microbiology. Sept 1986. v. 52 (3). p. 552-555. Includes references. (NAL Call No.: DNAL 448.3 AP5).

0909

Bacterial diseases of beans in Wyoming.
BAESD. Vincelli, P.C. Laramie, Wyo. : The Service. Bulletin - Wyoming University, Cooperative Extension Service. Jan 1989. (916). 4 p. ill. (NAL Call No.: DNAL 275.29 W99B).

0910

Clustering and conservation of genes controlling the interactions of Pseudomonas syringae pathovars with plants.
Panopoulos, N.J. Lindgren, P.B.; Willis, D.K.; Peet, R.C. Cold Spring Harbor, N.Y. : Cold Spring Harbor Laboratory, 1985. Plant cell/cell interactions / edited by Ian Sussex ... et al. . Paper presented at a meeting on the topic of plant cell/cell interactions at the Banbury Conference Center of Cold Spring Harbor Laboratory, New York, October 2-4, 1985. p. 69-75. Includes references. (NAL Call No.: DNAL QK725.P552).

0911

Development and application of a plasmid DNA probe for detection of bacteria causing common bacterial blight of bean.
PHYTA. Gilbertson, R.L. Maxwell, D.P.; Hagedorn, D.J.; Leong, S.A. St. Paul, Minn. : American Phytopathological Society. Total plasmid DNA and cloned plasmid DNA fragments from Xanthomonas campestris pv. phaseoli were used as probes to detect X. c. phaseoli and X. c. phaseoli var. fuscans, causal agents of common bacterial blight of bean. Plasmid DNA hybridized extensively to total genomic DNA from 50 strains of X. c. phaseoli and X. c. phaseoli var. fuscans, less extensively to that from X. c. pvs. alfalfae, carotae, vesicatoria (races 1 and 2), and oryzae, and not at all to that from X. c. pvs. campestris, holcicola, or pelargonii, nonpathogenic xanthomonads from bean debris or other bacterial species. A 3.4-kb EcoRI fragment of plasmid DNA, which contains repetitive DNA, was a more specific probe for X. c. phaseoli and X. c. phaseoli var. fuscans than total plasmid DNA. The limit of detection of these probes was 10(3) X. c. phaseoli colony-forming units (approximately 10 pg of DNA). A colony hybridization procedure was used to detect colonies of X. c. phaseoli recovered from bean leaves and debris, and squash and dot blot hybridization procedures were used to detect X. c. phaseoli in bean leaves. Our results indicate that DNA probes are a useful tool for detecting plant pathogenic xanthomonads and may be used in ecological and epidemiological studies. Phytopathology. May 1989. v. 79 (5). p. 518-525. Includes references. (NAL Call No.: DNAL 464.8 P56).

0912

Development of common blight and accumulation of fluoride in red kidney bean plants exposed continuously or intermittently to hydrogen fluoride.
PHYTA. Reynolds, K.L. Laurence, J.A. St. Paul, Minn. : American Phytopathological Society. Four-week-old bean plants (cultivar California Light Red Kidney) were spray inoculated with rifampin-resistant Xanthomonas campestris pv. phaseoli to establish a leaf-surface population on one leaf and a lesion on another leaf of each plant. In one experiment, plants were exposed to 0 or 1 microgram F m-3 (as hydrogen fluoride) continuously or 3 or 5 microgram F m-3 intermittently for 15 days. In the other experiment, plants were exposed continuously to 0 or 1 microgram F m-3 for 15 days or 3 microgram F m-3 for 5 days or 5 microgram F m-3 for 3 days after inoculation. Fluoride treatments in both experiments resulted in a total pollutant dose of 15 microgram F m-3 days. Diameters of lesions were measured and leaves were sampled periodically to determine fluoride accumulation. Intermittent exposure treatments had no effect on final lesion growth. However, lesion size and expansion increased linearly with increasing fluoride in foliage. Intermittent fluoride exposure had no effect on growth of epiphytic populations of the bacterium. The development of lesions and leaf-surface populations of the pathogen exposed continuously were not affected by the exposure regime or the concentration of fluoride in air or foliage. Phytopathology. Feb 1990. v. 80 (2). p. 211-216. Includes references. (NAL Call No.: DNAL 464.8 P56).

0913

Diel variation in population size and ice nucleation activity of Pseudomonas syringae on snap bean leaflets.
APMBA. Hirano, S.S. ARS, USDA; Upper, C.D. Washington, D.C. : American Society for Microbiology. The extent to which diel changes in the physical environment affect changes in population size and ice nucleation activity of Pseudomonas syringae on snap bean leaflets was determined under field conditions. To estimate bacterial population size and ice nucleation activity, bean leaflets were harvested at 2-h intervals during each of three 26-h periods. A tube nucleation test was used to assay individual leaflets for ice nuclei. Population sizes of P. syringae were determined by dilution plating of leaflet homogenates. The overall diel changes in P. syringae population sizes differed during each of the 26-h periods. In one 26-h period, there was a continuous increased in the logarithm of P. syringae population size despite intense solar

radiation, absence of free moisture on leaf surfaces, and low relative humidity during the day. A mean doubling time of approximately 4.9 h was estimated for the 28-fold increase in P. syringae population size that occurred from 0900 to 0900 h during the 26-h period. However, doubling times of 3.3 and 1.9 h occurred briefly during this period from 1700 to 2300 h and from 0100 to 0700 h, respectively. Thus, growth rates of P. syringae in association with leaves in the field were of the same order of magnitude as optimal rates measured in the laboratory. The frequency with which leaflets bore ice nuclei active at -2.0, -2.2, and -2.5 degreegs C varied greatly within each 26-h period. These large diel changes were inversely correlated primarily with the diel changes in air temperature and reflected changes in nucleation frequency rather than changes in population size of P. syringae. Thus, the response of bacterial ice nucleation activity to the physical environment was distinct from the changes in population size of ice nucleation-active P. syringae. Applied and environmental microbiology. Mar 1989. v. 55 (3). p. 623-630. Includes references. (NAL Call No.: DNAL 448.3 AP5).

0914

Disease problems on dry peas, lentils, chickpeas and faba beans.
Kaiser, W.J. St. Paul, Minn. : Center for Alternative Crops and Products, University of Minnesota, 1987? . Grain legumes as alternative crops : a symposium / sponsored by the Center for Alternative Crops and Products, University of Minnesota, July 23-24, 1987. p. 157-174. Includes references. (NAL Call No.: DNAL SB317.L43G73).

0915

Effect of bacterial infection on speed and horizontal trajectory of circumnutation in bean shoots.
PHYTAJ. Kennedy, B.W. Denny, R.L.; Carlson, L.; Koukkari, L. St. Paul, Minn. : American Phytopathological Society. Phytopathology. July 1986. v. 76 (7). p. 712-715. Includes 7 references. (NAL Call No.: DNAL 464.8 P56).

0916

Effect of copper pesticides on epiphytic populations of Pseudomonas syringae on dry beans in Colorado.
Garrett, K.A. Schwartz, H.F. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1988. v. 31. p. 70-71. (NAL Call No.: DNAL SB327.A1B5).

0917

The effect of inoculation methods, pathogenic variability and inoculum concentrations on reactions and genetics of resistance to isolates of Xanthomonas campestris P.V. pasheoli in leaves and pods of dry beans (Phaseolus vulgaris L.).
Leyna, H. Coyne, D.P. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. Mar 1985. v. 28. p. 70-71. (NAL Call No.: DNAL SB327.A1B5).

0918

Effect of phaseolotoxin on the synthesis of arginine and protein.
PLPHA. Turner, J.G. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Mar 1986. v. 80 (3). p. 760-765. Includes 22 references. (NAL Call No.: DNAL 450 P692).

0919

Effect of plant species and environmental conditions on epiphytic population sizes of Pseudomonas syringae and other bacteria.
PHYTA. O'Brien, R.D. Lindow, S.E. St. Paul, Minn. : American Phytopathological Society. Selected biological and environmental effects influenced epiphytic colonization of plants by Pseudomonas syringae, Escherichia coli, Salmonella typhimurium, Aeromonas hydrophila, and Rhizobium meliloti when tested in a growth chamber at 24 C. Epiphytic population size varied with plant host, environmental conditions, and among strains of P. syringae tested. Strains of P. syringae achieved only slightly larger population sizes than strains from other genera when incubated on inoculated plants for 48 hr, and near 100% relative humidity (RH). However, the strains of P. syringae maintained populations at least 25 times higher after a subsequent 72 hr at 40% RH. Epiphytic population sizes of 15 different strains of P. syringae varied up to 10-fold on a given plant species, indicating epiphytic diversity within this bacterial species. Relative population sizes of three strains of P. syringae on plants under field conditions were predicted by growth chamber populations. Neither epiphytic strains, pathogenic strains, or toxin producing groups were associated with greater epiphytic population sizes. Different plant species varied up to 17-fold in the size of bacterial populations supported. Maceration of inoculated plant tissue increased bacterial population size estimates relative to cells removed by sonication, but only after low RH incubations. Phytopathology. May 1989. v. 79 (5). p. 619-627. Includes references. (NAL Call No.: DNAL 464.8 P56).

0920

Effect of pure and mixed suspensions of virulent and heterologous isolates of Xanthomonas campestris on the infectivity of the inoculum on two species of Phaseolus.
JAUPA. Zapata, M. Mayaguez : University of Puerto Rico, Agricultural Experiment Station. The Journal of agriculture of the University of Puerto Rico. Apr 1985. v. 69 (2). p. 191-199. Includes references. (NAL Call No.: DNAL 8 P832J).

0921

Effects of hydrogen fluoride on growth, common blight development, and the accumulation of fluoride in field-grown red kidney beans.
PHYTAJ. Reynolds, K.L. Ithaca, NY; Laurence, J.A. St. Paul, Minn. : American Phytopathological Society. Field-grown California Light Red Kidney bean plants were spray-inoculated with a suspension of rifampin-resistant Xanthomonas campestris pv. phaseoli and exposed intermittently to hydrogen fluoride (HF) at 0,2, or 4 micrograms F m-3 in open-top chambers during the summers of 1984 or 1985. Plants were exposed for 8 hr day-1,2 days each week for 9 wk in 1984 or for 8 hr day-1, 4 days each week for 10 wk in 1985. Foliar accumulation of fluoride, disease severity, and epiphytic populations of the pathogen and other (unidentified) leaf surface microorganisms were determined weekly. The area under disease progress curve and final disease severity were not affected by exposure to HF, but the apparent infection rate increased with an increase in concentration HF in 1985. There was no effect of exposure to HF on growth of epiphytic populations of the pathogen or on the populations of other epiphytic bacteria during either year. However, in both years the growth rate of fungal populations increased with an increase in concentration of HF. Yield was not affected by HF in 1984 but decreased with an increase in concentration of fluoride in foliar tissues in 1985. Phytopathology. Sept 1988. v. 78 (9). p. 1168-1173. Includes references. (NAL Call No.: DNAL 464.8 P56).

0922

Epidemiology and control of bacterial blight and canker of cowpea.
PLDRA. Gitaitis, R.D. Bell, D.K. St. Paul, Minn. : American Phytopathological Society. Plant disease. Mar 1986. v. 70 (3). p. 187-190. Includes 15 references. (NAL Call No.: DNAL 1.9 P69P).

0923

Gene cluster of Pseudomonas syringae pv. "phaseolicola" controls pathogenicity of bean plants and hypersensitivity on nonhost plants.
JOBAAY. Lindgren, P.B. Peet, R.C.; Panopoulos, N.J. Washington, D.C. : American Society for Microbiology. Journal of bacteriology. Nov 1986. v. 168 (2). p. 512-522. ill. Includes references. (NAL Call No.: DNAL 448.3 J82).

0924

A gene for resistance to common blight (Xanthomonas campestris pv. phaseoli).
Adams, M.W. Kelly, J.D.; Saettler, A.W. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1988. v. 31. p. 73-74. (NAL Call No.: DNAL SB327.A1B5).

0925

Genetic control over hybrid plant development in interspecific crosses between Phaseolus vulgaris L. and Phaseolus acutifolius A. Gray.
Parker, J.P. Michaels, T.E. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. Mar 1986. v. 29. p. 22-23. (NAL Call No.: DNAL SB327.A1B5).

0926

Heritability, phenotypic correlations, and associations of the common blight disease reactions in beans.
JOSHB. Aggour, A.R. Coyne, D.P. Alexandria, Va. : The Society. Common blight in beans (Phaseolus vulgaris L.) incited by Xanthomonas campestris pv. phaseoli (Smith) Dye (X c p) reduces crop yield and seed quality. The objective of this experiment was to study heritability and phenotypic correlations of the disease reaction to various strains of X c p at several plant developmental stages in specific bean crosses using diverse methods of inoculation. Leaf and pod disease reactions to strains X c p were inherited quantitatively and narrow-sense heritability estimates were low in the following crosses between Phaseolus vulgaris cultivars/lines: Bac-6 (moderately resistant = MR) x NE-EP1 (MR); Bat-862 (MR) x Pompadour Checa' (susceptible = S); Pompadour Checa' (S) x Bac-6 (MR); Venezuela 44' (S) x Bat-862 (MR). Pod disease reaction was not correlated with leaf disease reaction at any growth stage. Low or nonsignificant phenotypic correlations were detected between disease reactions of leaves at the seedling and flowering stages with the several methods of inoculation. Intermediate phenotypic cprrelations were found for disease reactions with three methods of inoculation at the seedling stage, but only with two methods in the flowering stage. Negative or nonsignificant phenotypic correlations were observed between leaf disease reaction and number of days to first flower. Different duplicate recessive genes were found to control two foliar abnormality traits: crippled growth and variegated leaves . No plants with a combination of both traits were observed. An association was found between crippled growth and a high level of resistance to strain V3S8 of Xc p in the cross Bat-862 x Pompadour Checa'. Journal of the American Society for

Horticultural Science. Sept 1989. v. 114 (5). p. 828-833. ill. Includes references. (NAL Call No.: DNAL 81 S012).

0927

Identification of Pseudomonas syringae pv. phaseolicola by a DNA hybridization probe.
PHYTA. Schaad, N.W. Azad, H.; Peet, R.C.; Panopoulos, N.J. St. Paul, Minn. : American Phytopathological Society. A 32P-labeled DNA probe carrying a gene(s) involved in phaseolotoxin production by Pseudomonas syringae pv. phaseolicola was used to detect and identify P. s. phaseolicola in pure or mixed cultures, seed-soak liquids, and diseased specimens collected in the field. The probe hybridized with all 34 strains of P. s. phaseolicola tested. All interspecific (pathovar) or intergeneric hybridizations were negative. Hybridization tests were highly reliable for pathogen detection and identification when individual colonies of P. s. phaseolicola could be picked individually from seed-soak liquid assay plates or when maceration fluids from disease lesions were assayed. Probings of maceration fluids from disease lesions also were highly reliable. In contrast, soak liquids from seeds contaminated with P. s. phaseolicola or washings of colonies from agar plates of such liquids gave variable results. Phytopathology. Aug 1989. v. 79 (8). p. 903-907. ill. Includes references. (NAL Call No.: DNAL 464.8 P56).

0928

An impoved agar plating assay for detecting Pseudomonas syringae pv. syringae and P. s. pv. phaseolicola in contaminated bean seed.
PHYTAJ. Mohan, S.K. Schaad, N.W. St. Paul, Minn. : American Phytopathological Society. Phytopathology. Oct 1987. v. 77 (10). p. 1390-1395. ill. Includes references. (NAL Call No.: DNAL 464.8 P56).

0929

Inheritance of resistance to common bacterial blight in common bean.
Scott, M.E. Michaels, T.E. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1988. v. 31. p. 72. (NAL Call No.: DNAL SB327.A1B5).

0930

Nonrandom patterns of bacterial brown spot in snap bean row segments.
PHYTA. Hudelson, B.D. Clayton, M.K.; Smith, K.P.; Rouse, D.I.; Upper, C.D. St. Paul, Minn. : American Phytopathological Society. Each leaflet on every plant in 37 5-m row segments and a single 12-m row segment from commercial snap bean fields was assessed for bacterial brown spot. Graphs of the proportion of diseased leaflets per plant (disease incidence values) versus plant position along the row suggested two types of nonrandom variability in disease: an extreme jaggedness superimposed on a slow, undulating change in disease. Arcsine square root-transformed disease incidence values were analyzed for spatial nonrandomness using three techniques: runs analysis, autocorrelation analysis, and autoregressive integrated moving average (ARIMA) modeling. All three techniques detected the slow, undulating change in disease incidence values; however, only ARIMA modeling detected the jaggedness and could quantify both patterns. A "generalized ARIMA(101) model" was found to describe 35 of the 38 data sets. The biological mechanism generating these patterns is unknown. Knowlegdge of the existence of such patterns is important for developing effective sampling strategies for this disease. Theoretical characteristics of the generalized ARIMA(101) model indicate that random start systematic sampling will provide a better estimate of total or mean brown spot in a row than simple random sampling. Phytopathology. June 1989 v. 79 (6). p. 674-681. Includes references. (NAL Call No.: DNAL 464.8 P56).

0931

Plasmid-chromosome recombination in Pseudomonas syringae pv. phaseolicola.
Mills, D. Ehrenshaft, M.; Williams, J.; Small, C.; Poplawsky, A. New York, N.Y. : Alan R. Liss. UCLA symposia on molecular and cellular biology. In the series analytic: Molecular Strategies for Crop Protection / edited by Charles J. Arntzen and Clarence Ryan. Proceedings of a Symposium held Mar 30-Apr 6, 1986, Steamboat Springs, Colorado. 1987. v. 48. p. 135-144. ill. Includes references. (NAL Call No.: DNAL QH506.U34).

0932

The relationship of Xanthomonas campestris pv. translucens to frost and the effect of frost on black chaff development in wheat.
PHYTAJ. Azad, H. Schaad, N.W. St. Paul, Minn. : American Phytopathological Society. Phytopathology. Jan 1988. v. 78 (1). p. 95-100. Includes references. (NAL Call No.: DNAL 464.8 P56).

0933

Role of nutrients in regulating epiphytic bacterial populations.
Morris, C.E. Rouse, D.I. St. Paul, Minn. : American Phytopathological Society, c1985. Biological control on the phylloplane / edited by Carole E. Windels and Steven E. Lindow. Papers presented at a symposium entitled "Biological Control Strategies in the Phylloplane," Aug 15, 1984, Guelph, Ontario. p. 63-82. (NAL Call No.: DNAL SB732.6.B5).

0934

Transmission of the common blight pathogen in bean seed.

JOSHB. Aggour, A.R. Coyne, D.P.; Vidaver, A.K.; Eskridge, K.M. Alexandria, Va. : The Society. Common blight in beans (Phaseolus vulgaris L.), incited by Xanthomonas campestris pv. phaseoli (Smith) Dye, is a serious seedborne disease in various parts of the world. We tried to detect possible differences in seed infection and transmission of bacteria in selected bean cultivars/lines. Dry seeds, flower buds (24 to 36 hr before anthesis), small pods (2 to 3 days old), and green seeds of individual plants of Bac-6, Venezuela 44', Pompadour Checa' dry beans, and of dry seed of Great Northern (GN) Tara' were examined for possible internal infection after inoculating the seeds, seedlings, and plants with common blight bacterium at various sites. Inoculation of the pedicels of the flower buds and small pods resulted in transmission of the bacteria through the vascular tissue or the pod to the seeds, causing internal infection without any external symptoms shown either by the pods or seeds. Bac-6 was resistant to seed infection, and Venezuela 44' was most susceptible, followed by Pompadour Checa' and GN Tara'. Planting infected seeds did not result in a systemic transmission of the bacteria in the vascular tissue of the plants to the seeds. Infected leaves were likely to be the main source for the external infection of pods, which could lead to internal and/or external seed infection. Breeding for resistance to seed infection and transmission of bacteria should aid the control of this disease. A useful technique for assessing internal infection of seeds with the bacteria was developed. Journal of the American Society for Horticultural Science. Nov 1989. v. 114 (6). p. 1002-1008. Includes references. (NAL Call No.: DNAL 81 SO12).

0935

An approach to control of bean golden mosaic virus in dry beans (Phaseolus vulgaris L.).
Sartorato, A. Seijas, C.A.R. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. Mar 1985. v. 28. p. 26-27. (NAL Call No.: DNAL SB327.A1B5).

0936

Bean yellow mosaic virus isolate that infects peanut (Arachis hypogaea).
PLDRA. Bays, D.C. Demski, J.W. St. Paul, Minn. : American Phytopathological Society. Plant disease. July 1986. v. 70 (7). p. 667-669. ill. Includes 14 references. (NAL Call No.: DNAL 1.9 P69P).

0937

Disease problems on dry peas, lentils, chickpeas and faba beans.
Kaiser, W.J. St. Paul, Minn. : Center for Alternative Crops and Products, University of Minnesota, 1987? . Grain legumes as alternative crops : a symposium / sponsored by the Center for Alternative Crops and Products, University of Minnesota, July 23-24, 1987. p. 157-174. Includes references. (NAL Call No.: DNAL SB317.L43G73).

0938

Effect of beetle regurgitant on plant virus transmission using the gross wounding technique.
PHYTAJ. Monis, J. Scott, H.A.; Gergerich, R.C. St. Paul, Minn. : American Phytopathological Society. Phytopathology. Aug 1986. v. 76 (8). p. 808-811. Includes references. (NAL Call No.: DNAL 464.8 P56).

0939

Human interferon does not protect cowpea plant cell protoplasts against infection with alfalfa mosaic virus.
VIRLA. Huisman, M.J. Broxterman, H.J.G.; Schellekens, H.; Van Vloten-Doting, L. New York, N.Y. : Academic Press. Virology. June 1985. v. 143 (2). p. 622-625. ill. Includes 19 references. (NAL Call No.: DNAL 448.8 V81).

0940

Incidence of bean common mosaic virus in USDA Phaseolus germ plasm collection.
PLDIDE. Klein, R.E. Wyatt, S.D.; Kaiser, W.J. St. Paul, Minn. : American Phytopathological Society. Plant disease. Apr 1988. v. 72 (4). p. 301-302. Includes references. (NAL Call No.: DNAL 1.9 P69P).

0941

Inheritance of resistance to broad bean wilt virus in bean.
HJHSA. Provvidenti, R. Alexandria, Va. : American Society for Horticultural Science. HortScience. Oct 1988. v. 23 (5). p. 895-896. Includes references. (NAL Call No.: DNAL SB1.H6).

0942

Inheritance of resistance to peanut mottle virus in Phaseolus vulgaris.
JOHEA. Provvidenti, R. Chirco, E.M. Washington, D.C. : American Genetic Association. The Journal of heredity. Nov/Dec 1987. v. 78 (6). p. 402-403. Includes references. (NAL Call No.: DNAL 442.8 AM3).

0943

Insecticidal soap reduced infection by two mechanically transmitted plant viruses.
PLDIDE. Zinnen, T.M. Vachris, J.W. St. Paul, Minn. : American Phytopathological Society. Plant disease. Mar 1990. v. 74 (3). p. 201-202. Includes references. (NAL Call No.: DNAL 1.9 P69P).

0944

Is there more than one source of the 'I' gene?.
Kelly, J.D. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1988. v. 31. p. 148-149. Includes references. (NAL Call No.: DNAL SB327.A1B5).

0945

Linkage analysis of hypersensitive resistance to four viruses in Phaseolus vulgaris L.
Kyle, M.M. Dickson, M.H.; Provvidenti, R. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. Mar 1986. v. 29. p. 80-81. Includes references. (NAL Call No.: DNAL SB327.A1B5).

0946

List of genes in Phaseolus vulgaris for resistance to viruses.
Provvidenti, R. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1987. v. 30. p. 1-4. Includes references. (NAL Call No.: DNAL SB327.A1B5).

0947

A marker locus, Adh-1, for resistance to pea enation mosaic virus in Pisum sativum.
JOHEA. Weeden, N.F. Provvidenti, R. Washington. D.C. : American Genetic Association. The Journal of heredity. Mar/Apr 1988. v. 79 (2). p. 128-131. Includes references. (NAL Call No.: DNAL 442.8 AM3).

0948

Monopartite spherical viruses.
Sehgal, O.P. White, J.A.; Mandahar, C.L. Boca Raton, Fla. : CRC Press, 1989. Plant viruses / editor, C.L. Mandahar. v. 1 p. 33-73. ill. Includes references. (NAL Call No.: DNAL QR351.P58).

0949

Pea enation mosaic virus resistance in lentil (Lens culinaris).
PLDRA. Aydin, H. Muehlbauer, F.J.; Kaiser, W.J. St. Paul, Minn. : American Phytopathological Society. Plant disease. July 1987. v. 71 (7). p. 635-638. ill. Includes references. (NAL Call No.: DNAL 1.9 P69P).

0950

Physicochemical properties of bean rugose mosaic virus.
PHYTAJ. Ramirez, P. Espinoza, A.M.; Fuentes, A.L.; Leon, P. St. Paul, Minn. : American Phytopathological Society. Phytopathology. Sept 1987. v. 77 (9). p. 1317-1321. ill. Includes references. (NAL Call No.: DNAL 464.8 P56).

0951

Possible molecular basis of immunity of cowpeas to cowpea mosaic virus.
Sanderson, J.L. Bruening, G.; Russell, M.L. New York : Alan R. Liss. UCLA symposia on molecular and cellular biology. Paper presented at the "Symposium on Molecular and Cellular Biology of Plant Stress," April 15-21, 1984, Keystone, Colorado. 1985. v. 22. p. 401-402. ill. Includes references. (NAL Call No.: DNAL QH506.U34).

0952

Protein-RNA interactions in an icosahedral virus at 3.0 agstrom resolution.
SCIEA. Chen, Z. Stauffacher, C.; Li, Y.; Schmidt, T.; Bomu, W.; Kamer, G.; Shanks, M.; Lomonossoff, G.; Johnson, J.E. Washington, D.C. : American Association for the Advancement of Science. Nearly 20 percent of the packaged RNA in bean-pod mottle virus (BPMV) binds to the capsid interior in a symmetric fashion and is clearly visible in the electron density map. The RNA displaying icosahedral symmetry is single-stranded with well-defined polarity and stereo-chemical properties. Interactions with protein are dominated by nonbonding forces with few specific contacts. The tertiary and quaternary structures of the BPMV capsid proteins are similar to those observed in animal picornaviruses, supporting the close relation between plant comoviruses and animal picornaviruses established by previous biological studies. Science. July 14, 1989. v. 245 (4914). p. 154-159. ill. Includes references. (NAL Call No.: DNAL 470 SCI2).

0953

Purification, characterization, and immunological analysis of nuclear inclusions induced by bean yellow mosaic and clover yellow vein potyviruses.
PHYTAJ. Chang, C.A. Hiebert, E.; Purcifull, D.E. St. Paul, Minn. : American Phytopathological Society. The nuclear inclusions (NI) induced by the PV-2 isolate of bean yellow mosaic virus (BYMV-PV-2) and the Pratt isolate of clover yellow vein virus (CYVV-P) were partially purified by treating infected tissue extracts with Triton X-100 followed by low-speed centrifugations. Purified NI from both viruses had cubic symmetry, but from the surface view the NI induced by BYMV-PV-2 were square-shaped, while those induced by CYVV-P were diamond-shaped. The NI of both viruses contained two distinct types of protein monomers with estimated Mr of 54,000 (54K) and 49K for BYMV-PV-2 and 60K and 49K for CYVV-P. The large NI monomers of both viruses were antigenically and chemically distinct from their respective small NI monomers. The NI proteins also were antigenicaly distinct from cylindrical inclusion and capsid proteins. A 98K protein and a 100K protein were consistently associated with NI preparations of BYMV-PV-2 and CYVV-P, respectively. These high Mr proteins were shown by immunological analyses and by peptide mapping to be polyproteins that contained sequences of both the large and the small NI monomers. Antisera prepared against SDS-dissociated NI proteins reacted specifically with NI in immunofluorescence studies of infected tissues. The large NI protein monomers of tobacco etch virus (TEV), BYMV-PV-2, and CYVV-P were serologically closely related to each other, while the small NI protein monomers of these three viruses were more viral specific as determined by SDS-immunodiffusion and by immunoprecipitation tests. In the cases of nine out of 14 potyviruses, extracts from infected tissues gave positive reactions for large NI protein-related antigens by indirect ELISA. Phytopathology. Oct 1988. v. 78 (10). p. 1266-1275. ill. Includes references. (NAL Call No.: DNAL 464.8 P56).

0954

Resistance-breaking variants of cowpea chlorotic mottle virus in soybean.
PLDIDE. Paguio, O.R. Kuhn, C.W.; Boerma, H.R. St. Paul, Minn. : American Phytopathological Society. Plant disease. Sept 1988. v. 72 (9). p. 768-770. ill. Includes references. (NAL Call No.: DNAL 1.9 P69P).

0955

Some biological and physicochemical properties of bean rugose mosaic virus.
PHYTAJ. Acosta, O. Alegria, A.; Lastra, R. St. Paul, Minn. : American Phytopathological Society. Phytopathology. Nov 1986. v. 76 (11). p. 1182-1189. ill. Includes 30 references. (NAL Call No.: DNAL 464.8 P56).

0956

The structure and in vitro assembly of southern bean mosaic virus in relation to that of other small spherical plant viruses.
Rossmann, M.G. Boca Raton, Fla. : CRC Press, c1985. Molecular plant virology / editor, Jeffrey W. Davies. Literature review. v. 1 p. 123-153. ill. Includes references. (NAL Call No.: DNAL QR351.M64).

0957

Three pea seedborne mosaic virus pathotypes from pea and lentil germ plasm.
PLDRA. Alconero, R. Provvidenti, R.; Gonsalves, D. St. Paul, Minn. : American Phytopathological Society. Plant disease. Aug 1986. v. 70 (8). p. 783-786. Includes 18 references. (NAL Call No.: DNAL 1.9 P69P).

0958

Transgenic plants that express the coat protein genes of tobacco mosaic virus or alfalfa mosaic virus interfere with disease development of some nonrelated viruses.
PHYTA. Anderson, E.J. Stark, D.M.; Nelson, R.S.; Powell, P.A.; Tumer, N.E.; Beachy, R.N. St. Paul, Minn. : American Phytopathological Society. Transgenic tobacco (Nicotiana tabacum Xanthi) plants that express the coat protein (CP) gene from the U1 strain of tobacco mosaic virus (TMV) are resistant to infection by TMV. To determine whether these plants also are protected against other viruses, they were inoculated with low concentrations of potato virus X (PVX), potato virus Y (PVY), cucumber mosaic virus (CMV), alfalfa mosaic virus (AlMV), and the cowpea strain of TMV (Cc-TMV). Although the accumulation of virus in inoculated leaves was equivalent in plants that express the CP gene (CP+) and plants that do not express the CP gene (CP-), there was a delay of 1 to 3 days in the development of systemic disease symptoms on CP(+) plants infected with PVX, PVY, CMV, and AlMV as compared with CP(-) plants. The magnitude of protection, however, was significantly lower than against TMV. Protection against CC-TMV, assayed on a CP(+) local lesion host, also was much lower than against TMV-U1. A delay in disease development also was observed when transgenic tobacco (N. tabacum Samsun) plants expressing the CP gene of AlMV were infected with PVX and CMV, but not when they were infected with TMV-U1. The results of these experiments demonstrate that transgenic tobacco plants that express different CP genes have a low but significant degree of protection against other viruses. Phytopathology. Includes statistical data. Nov 1989. v. 79 (11). p. 1284-1290. Includes references. (NAL Call No.: DNAL 464.8 P56).

0959

Virus eradication from a bean germplasm collection.
Klein, R.E. Wyatt, S.D.; Kaiser, W.J. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. Mar 1986. v. 29. p. 37. (NAL Call No.: DNAL SB327.A1B5).

0960

Viruses of cowpea.
Fulton, J.P. Fayetteville, Ark. : Arkansas State Horticultural Society. Proceedings of the ... annual meeting - Arkansas State Horticultural Society. Paper presented at the "106th Annual Meeting of the Arkansas State Horticultural Society," November 13 and 14, 1985, Fort Smith, Arkansas. 1985. (106). p. 64. (NAL Call No.: DNAL SB21.A7A7).

0961

The I gene and broad spectrum potyvirus resistance.
Kyle, M. Dickson, M.H.; Provvidenti, R. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1988. v. 31. p. 146-147. Includes references. (NAL Call No.: DNAL SB327.A1B5).

0962

Aluminium tolerance and calcium efficiency of cowpea genotypes.
JPNUDS. Horst, W.J. New York, N.Y. : Marcel Dekker. Journal of plant nutrition. Paper presented at the "Tenth International Plant Nutrition Colloquium," August 4-9, 1986, Beltsville, Maryland. 1987. v. 10 (9116). p. 1121-1129. Includes references. (NAL Call No.: DNAL QK867.J67).

0963

Boron tolerance of snap bean and cowpea.
JOSHB. Francois, L.E. Alexandria, Va. : The Society. The effect of excess B in the soil solution on snap bean (Phaseolus vulgaris L.) and cowpea Vigna unguiculata (L.) Walp. was determined in large, outdoor sand tanks. Boron treatments were imposed by irrigation with culture solutions than contained 0.5, 1.0, 3.0, 6.0, 9.0, or 12.0 mg B/liter for snap bean; and 1.0, 2.0, 3.0, 4.0, 6.0, or 8.0 mg B/liter for cowpea. Relative pod yield of snap bean was reduced 12.1% and cowpea seed yield was reduced 11.5% with each unit (mg.liter-1) increase in soil solution B (Bsw) greater than 1.0 and 2.5 mg B/liter, respectively. Reduced yield of snap bean pods and cowpea seeds was attributed primarily to a reduction in pod number. Increasing Bsw significantly reduced plant size of both species. Journal of the American Society for Horticultural Science. July 1989. v. 114 (4). p. 615-619. Includes references. (NAL Call No.: DNAL 81 S012).

0964

Changes in the levels of major sulfur metabolites and free amino acids in pea cotyledons recovering from sulfur deficiency.
PLPHA. Macnicol, P.K. Randall, P.J. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Feb 1987. v. 83 (2). p. 354-359. Includes references. (NAL Call No.: DNAL 450 P692).

0965

Effect of corn, sugarbeets, and fallow on zinc availability to subsequent crops.
SSSJD4. Leggett, G.E. Westermann, D.T. Madison, Wis. : The Society. Soil Science Society of America journal. July/Aug 1986. v. 50 (4). p. 963-968. Includes references. (NAL Call No.: DNAL 56.9 S03).

0966

Effect of date of planting on seed coat cracking, adhesion and internal morphology of seed coat to cotyledon of dry beans (Phaseolus vulgaris).
Bailie, J.E. Coyne, D.P.; Paparozzi, E.T.; Hanna, M.A. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. Mar 1985. v. 28. p. 58-59. (NAL Call No.: DNAL SB327.A1B5).

0967

Effect of urea, ammonium and nitrate on foliar absorption of ferric citrate.
JPNUDS. Reed, D.W. New York, N.Y. : Marcel Dekker. Journal of plant nutrition. Paper presented at the "Fourth International Symposium on Iron Nutrition and Interactions in Plants," July 6-9, 1987, University of New Mexico, Albuquerque. June/Nov 1988. v. 11 (6/11). p. 1429-1437. Includes references. (NAL Call No.: DNAL QK867.J67).

0968

Genetic variation and genotype X environment interaction for leaf iron-deficiency chlorosis in dry beans (Phaseolus vulgaris L.).
Zaiter, H.Z. Coyne, D.P.; Clark, R.B. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1987. v. 30. p. 60-61. (NAL Call No.: DNAL SB327.A1B5).

0969

Genetic variation and inheritance of resistance of leaf iron deficiency chlorosis in dry bean (Phaseolus vulgaris L.).
Zaiter, H.Z. Coyne, D.P.; Clark, R.B. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1987. v. 30. p. 59. (NAL Call No.: DNAL SB327.A1B5).

0970

Genetic variation in field and nutrient solutions and the effect of temperature for leaf chlorosis in dry beans (Phaseolus vulgaris L.).
Zaiter, H.Z. Coyne, D.P.; Clark, R.B.; Nuland, D.S. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. Mar 1986. v. 29. p. 34. (NAL Call No.: DNAL SB327.A1B5).

0971

The influence of acid factors on the growth of snapbeans major appalachian soils.
CSOSA2. Wright, J.R. Baligar, V.C.; Wright, S.F. New York, N.Y. : Marcel Dekker. Communications in soil science and plant analysis. Nov 1987. v. 18 (11). p. 1235-1252. Includes references. (NAL Call No.: DNAL S590.C63).

0972

The influence of aluminum on photosynthesis and translocation in French bean.
JPNUDS. Hoddinott, J. Richter, C. New York, N.Y. : Marcel Dekker. Journal of plant nutrition. Mar 1987. v. 10 (4). p. 443-454. Includes references. (NAL Call No.: DNAL QK867.J67).

0973

Inheritance of two somaclonal variants in mung bean (Vigna radiata (L.) Wilczek).
JOHEA. Bhatia, C.R. Mathews, H. Washington, D.C. : American Genetic Association. The Journal of heredity. Mar/Apr 1988. v. 79 (2). p. 122-124. Includes references. (NAL Call No.: DNAL 442.8 AM3).

0974

Leaf water potential and crop color change in water-stressed peas.
HJHSA. Oosterhuis, D.M. Le Maire, F.; Le Maire, C. Alexandria, Va. : American Society for Horticultural Science. HortScience. June 1987. v. 22 (3). p. 429-431. ill. Includes references. (NAL Call No.: DNAL SB1.H6).

0975

Ontogenetic changes and assimilate partitioning in aborting and nonaborting seeds of Phaseolus vulgaris L.
Sage, T.L. Webster, B.D. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1987. v. 30. p. 82. (NAL Call No.: DNAL SB327.A1B5).

0976

Rhizosphere acidification as a response to iron deficiency in bean plants.
PLPHA. Vos, C.R. de. Lubberding, H.J.; Bienfait, H.F. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. July 1986. v. 81 (3). p. 842-846. Includes 32 references. (NAL Call No.: DNAL 450 P692).

0977

Rhizosphere physiology of crested wheatgrass and legume seedlings: root-shoot carbohydrate interactions.
JPNUDS. Bennett, J.H. Chatterton, N.J.; Harrison, P.A. New York, N.Y. : Marcel Dekker. Journal of plant nutrition. Paper presented at the "Fourth International Symposium on Iron Nutrition and Interactions in Plants," July 6-9, 1987, University of New Mexico, Albuquerque. June/Nov 1988. v. 11 (6/11). p. 1099-1116. ill. Includes references. (NAL Call No.: DNAL QK867.J67).

0978

Seed coatings to reduce imbibitional chilling injury.
Taylor, A.G. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1987. v. 30. p. 30-31. ill. Includes references. (NAL Call No.: DNAL SB327.A1B5).

0979

Transcriptional and posttranscriptional control of phaseolin and phytohemagglutinin gene expression in developing cotyledons of Phaseolus vulgaris.
PLPHA. Chappell, J. Chrispeels, M.J. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. May 1986. v. 81 (1). p. 50-54. Includes 23 references. (NAL Call No.: DNAL 450 P692).

0980

Absorption, translocation, and metabolism of 14C-thuringiensin (beta-exotoxin) in snapbeans.
FETMA. Mersie, W. Singh, M. Gainesville, Fla. : Florida Entomological Society. Florida entomologist. June 1988. v. 71 (2). p. 105-111. Includes references. (NAL Call No.: DNAL 420 F662)

0981

Acid precipitation effects on growth and yield responses of twenty soybean and twelve snap bean cultivars.
JEVQAA. Reddy, M.R. Madison, Wis. : American Society of Agronomy. Greenhouse studies were conducted to determine the effects of simulated acid precipitation on growth, yield, and nutrient content of soybean Glycine max (L.) Merr. and snap bean (Phaseolus vulgaris L.). Twenty cultivars of soybean and twelve cultivars of snap bean were grown in pots and treated with simulated precipitation at pH 2.5, 3.5, 4.5, or 5.6 (control). Soybean and snap bean plants were treated with simulated precipitation once a week beginning until fruit maturity. Soybean plants showed leaf scorching and yellowing of leaves at pH 2.5 and 3.5, whereas snap bean did nct show any visible symptoms. Soybean and snap bean cultivars responded differently to acid precipitation treatments. 'McNair 700' and 'Pioneer 5482' soybean and 'Commodore' bush and 'Provider' bush snap bean cultivars yields were decreased significantly under acid treatments. Eighteen soybean and 10 snap bean cultivars were unaffected. In general, aid precipitation treatments resulted in a greater number of soybean pods without seed compared to the control. Treatments at pH 3.5 and 2.5 affected soybean and snap bean growth and yield more than the other pH levels. Potassium content of soybean shoot decreased significantly under acid precipitation treatments, whereas Ca, Mg, and micronutrient contents were not affected by low pH treatment. Nutrient content of snap bean was unaffected by acidity. Journal of environmental quality. Apr/June 1989. v. 18 (2). p. 145-148. Includes references. (NAL Call No.: DNAL QH540.J6).

0982

Aluminium tolerance and calcium efficiency of cowpea genotypes.
JPNUDS. Horst, W.J. New York, N.Y. : Marcel Dekker. Journal of plant nutrition. Paper presented at the "Tenth International Plant Nutrition Colloquium," August 4-9, 1986, Beltsville, Maryland. 1987. v. 10 (9116). p. 1121-1129. Includes references. (NAL Call No.: DNAL QK867.J67).

0983

Aluminum tolerances of two snapbean cultivars related to organic acid content evaluated by high-performance liquid chromatography.
JPNUDS. Lee, E.H. Foy, C.D. New York, N.Y. : Marcel Dekker. Journal of plant nutrition. 1986. v. 9 (12). p. 1481-1498. ill. Includes 11 references. (NAL Call No.: DNAL QK867.J67).

0984

Assessing risk of solid waste compost.
BCYCDK. Dyer, J.M. Razvi, A.S. Emmaus, Pa. : J.G. Press. BioCycle. Mar 1987. v. 28 (3). p. 31-36. Includes references. (NAL Call No.: DNAL 57.8 C734).

0985

Biomass synthesis and nitrite reductase activity as indicators of phytotoxicity of some herbicides.
PNWSB. Zbiec, I.I. Devlin, R.M.; Nowicka, S.E. College Park, Md. : The Society. Proceedings of the annual meeting - Northeastern Weed Science Society. Meeting held on January 4-6, 1989, Baltimore, Maryland. 1989. v. 43. p. 49-52. Includes references. (NAL Call No.: DNAL 79.9 N814).

0986

Cadmium-induced accumulation of putrescine in oat and bean leaves.
PLPHA. Weinstein, L.H. Kaur-Sawhney, R.; Rajam, M.V.; Wettlaufer, S.H.; Galston, A.W. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Nov 1986. v. 82 (3). p. 641-645. Includes references. (NAL Call No.: DNAL 450 P692).

0987

Carbon dioxide and light responses of photosynthesis in cowpea and pigeonpea during water deficit and recovery.
PLPHA. Lopez, F.B. Setter, T.L.; McDavid, C.R. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Dec 1987. v. 85 (4). p. 990-995. Includes references. (NAL Call No.: DNAL 450 P692).

0988

Chemical modification of environmentally sensitive plants with GA biosynthesis inhibitors in response to SO2 stress.
PPGGD. Lee, E.H. Byun, J.K.; Wilding, S.J. Lake Alfred : The Society. Proceedings annual meeting - Plant Growth Regulator Society of America. 1985. (12th). p. 152-158. Includes references. (NAL Call No.: DNAL SB128.P5).

0989

Chilling-induced ethylene production by beans and peas.
JPGRDI. Tong, C.B.S. Yang, S.F. New York, N.Y. : Springer. Journal of plant growth regulation. 1987. v. 6 (4). p. 201-208. Includes references. (NAL Call No.: DNAL QK745.J6).

0990

Chlorsulfuron inhibition of cell cycle progression and the recovery of G1 arrested cells by Ile and Val.
JPGRDI. Robbins, J. Rost, T.L. New York, N.Y. : Springer. Journal of plant growth regulation. 1987. v. 6 (2). p. 67-74. Includes references. (NAL Call No.: DNAL QK745.J6).

0991

Chlorsulfuron persistence and response of legumes in an alkaline soil.
JPFCD2. Moyer, J.R. Bergen, P.; Kozub, G.C. New York, N.Y. : Marcel Dekker. Journal of environmental science and health : Part B : Pesticides, food contaminants, and agricultural wastes. 1989. v. 24 (1). p. 37-56. Includes references. (NAL Call No.: DNAL TD172.J61).

0992

Comparative leaf morphology of field beans resistant and susceptible to air pollutant ozone.
Baker, D. Rangappa, M.; Benepal, P.S. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1988. v. 31. p. 106-107. Includes references. (NAL Call No.: DNAL SB327.A1B5).

0993

Comparative persistence and mobility of pyridine and phenoxy herbicides in soil.
WETEE9. Jotcham, J.R. Smith, D.W.; Stephenson, G.R. Champaign, Ill. : The Society. Weed technology : a journal of the Weed Science Society of America. Jan/Mar 1989. v. 3 (1). p. 155-161. Includes references. (NAL Call No.: DNAL SB610.W39).

0994

Comparison of ozone symptom expression among plant introductions of Phaseolus vulgaris L. between laboratory and field studies.
Chappelka, A.H. Rangappa, M.; Robbins, E.; Benepal, P.S. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1987. v. 30. p. 74-75. Includes references. (NAL Call No.: DNAL SB327.A1B5).

0995

Comparison of TTC and electrical conductivity heat tolerance screening techniques in Phaseolus.
HJHSA. Schaff, D.A. Clayberg, C.D.; Milliken, G.A. Alexandria, Va. : American Society for Horticultural Science. HortScience. Aug 1987. v. 22 (4). p. 642-645. Includes references. (NAL Call No.: DNAL SB1.H6).

0996

Controlling seed weathering in the field.
Potts, H.C. Mississippi State, Miss. : The Station. MAFES research highlights - Mississippi Agricultural & Forestry Experiment Station. Mar 1985. v. 48 (3). p. 8. (NAL Call No.: DNAL 100 M69MI).

0997

Copper toxicity affects photosystem II electron transport at the secondary quinone acceptor, Q(B).
PLPHA. Mohanty, N. Vass, I.; Demeter, S. Rockville, Md. : American Society of Plant Physiologists. The nature of Cu2+ inhibition of photosystem II (PSII) photochemistry in pea (Pisum sativum L.) thylakoids was investigated monitoring Hill activity and light emission properties of photosystem II. In Cu2+-inhibited thylakoids, diphenyl carbazide addition does not relieve the loss of Hill acivity. The maximum yield of fluorescence induction restored by hydroxylamine in Tris-inactivated thylakoids is markedly reduced by Cu2+. This suggests that Cu2+ does not act on the donor side of PSII but on the reaction center of PSII or on components beyond. Thermoluminescence and delayed luminescence studies show that charge recombination between the positively charged intermediate in water oxidation cycle (S2) and negatively charged primary quinone acceptor of pSII (Q(A)-) is largely unaffected by Cu2+. The S2Q(B)- charge recombination, however, is drastically inhibited which parallels the loss of Hill activity,. This indicates that Cu2+ inhibits photosystem II photochemistry primarily affecting the function of the secondary quinone electron acceptor, Q(B). We suggest that Cu2+ does not block electron flow between the primary and secondary quinone acceptor but modifies the Q(B) site in such a way that it becomes unsuitable for further photosystem II photochemistry. Plant physiology. May 1989. v. 90 (1). p. 175-179. Includes references. (NAL Call No.: DNAL 450 P692).

0998

Cyanazine residues on fieldbeans (Phaseolus vulgaris) as a replant crop.
WETEE9. Wilson, R.G. Champaign, Ill. : The Society. Weed technology : a journal of the Weed Science Society of America. Jan 1988. v. 2 (1). p. 28-30. Includes references. (NAL Call

No.: DNAL SB610.W39).

0999

Dicamba, chlorsulfuron, and clopyralid as sprayer contaminants on sunflower (Helianthus annuus), mustard (Brassica juncea), and lentil (Lens culinaris), respectively.
WEESA6. Derksen, D.A. Champaign, Ill. : Weed Science Society of America. Simulated sprayer tank residues of the broadleaf weed herbicides dicamba, chlorsulfuron, and clopyralid applied alone and with the grass weed herbicides sethoxydim and diclofop on sunflower, tame mustard, and lentil, respectively, caused visible crop injury and reduced dry weight and yield. Dry weight production in the greenhouse and crop tolerance ratings in the field indicated that the grass weed herbicides enhanced crop injury from dicamba, chlorsulfuron, and clopyralid. Yield reductions in field experiments were also greater when dicamba and clopyralid were mixed with grass weed herbicides and applied on sunflower and lentil, respectively. This did not occur with chlorsulfuron applied to mustard. When mixed with simulated broadleaf weed herbicide residues, diclofop enhanced dry weight reductions and crop injury and reduced yield to a greater extent than sethoxydim. Crop tolerance ratings differentiated treatments and rates but were not a good estimate of the extent of yield loss. When broadleaf weed herbicides were applied at rates simulating sprayer tank residues alone or combined with grass weed herbicides, yield losses ranged up to 40% in sunflower, 70% in mustard, and 95% in lentil, compared to the untreated check. Weed science. July 1989. v. 37 (4). p. 616-621. Includes references. (NAL Call No.: DNAL 79.8 W41).

1000

Differential response of fourteen plant introductions of Phaseolus vulgaris L. to ozone in the field.
Chappelka, A.H. Rangappa, M.; Gross, P.; Benepal, P.S. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1987. v. 30. p. 72-73. Includes references. (NAL Call No.: DNAL SB327.A1B5).

1001

Differential responses of four bean cultivars to chronic doses of ozone.
JOSHB. Heck, W.W. Dunning, J.A.; Reinert, R.A.; Prior, S.A.; Rangappa, M.; Benepal, P.S. Alexandria, Va. : The Society. Journal of the American Society for Horticultural Science. Jan 1988. v. 113 (1). p. 46-51. Includes references. (NAL Call No.: DNAL 81 S012).

1002

Differntial effect of a water deficit on the growth of the central leaflet of Phaseolus vulgaris L. of determinate growth habit.
Kohashi-Shibata, J. Uscanga-Mortera, E. Fort Collins, Colo : Howard F. Schwartz, Colorado State University. Annual report of the Bean Improvement Cooperative. 1989. v. 32. p. 44-45. (NAL Call No.: DNAL SB327.A1B5).

1003

Effect of chromium VI on mineral element composition of bush beans.
JPNUDS. Barcelo, J. Poschenrieder, C.; Gunse, B. New York, N.Y. : Marcel Dekker. Journal of plant nutrition. 1985. v. 8 (3). p. 211-217. Includes 10 references. (NAL Call No.: DNAL QK867.J67).

1004

Effect of electroplating factory effluent on the germination and growth of hyacinth bean and mustard.
ENVRA. Ajmal, M. Khan, A.U. Orlando, Fla. : Academic Press. Environmental research. Dec 1985. v. 38 (2). p. 248-255. ill. Includes references. (NAL Call No.: DNAL RA565.A1E5).

1005

Effect of hydrogen fluoride fumigation in Triticum aestivum, Brassica juncea and Phaseolus aureus plants.
FLUOA. Sharma, H.C. Warren, Mich. : International Society for Fluoride Research. Fluoride. Jan 1985. v. 18 (1). p. 15-22. ill. Includes 17 references. (NAL Call No.: DNAL QP981.F55F55).

1006

The effect of leaf water variables on ice nucleating Pseudomonas syringae in beans.
HJHSA. Cary, J.W. Lindow, S.E. Alexandria, Va. : American Society for Horticultural Science. HortScience. Dec 1986. v. 21 (6). p. 1417-1418. ill. Includes references. (NAL Call No.: DNAL SB1.H6).

1007

The effect of long term use of harbicides on an orchard soil.
Lourens, A.F. Lange, A.H. S.l. : Western Society of Weed Science. Research progress report - Western Society of Weed Science. 1987. p. 107-108. (NAL Call No.: DNAL 79.9 W52R).

1008

Effect of relative humidity prior to and during exposure on response of peas to ozone and sulfur dioxide.
JOSHB. Kobriger, J.M. Tibbitts, T.W. Alexandria, Va. : The Society. Journal of the American Society for Horticultural Science. 1985. v. 110 (1). p. 21-24. Includes references. (NAL Call No.: DNAL 81 S012).

1009

Effect of temperature on root length under water-limited conditions for Phaseolus acutifolius and Phaseolus vulgaris.
Bouscaren, S.J. Lazcano F, I.; Waines, J.G. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1987. v. 30. p. 83-84. Includes references. (NAL Call No.: DNAL SB327.A1B5).

1010

Effect of water stress on the ovules of Phaseolus vulgaris L.
Yanez-Jimenez, P. Kohashi-Shibata, J. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1987. v. 30. p. 92-93. (NAL Call No.: DNAL SB327.A1B5).

1011

Effects of dimethazone (FMC 57020) on chloroplast development. I. Ultrastructural effects in cowpea (Vigna unguiculata L.) primary leaves.
PCBPB. Duke, S.O. Paul, R.N. Duluth, Minn. : Academic Press. Pesticide biochemistry and physiology. Feb 1986. v. 25 (1). p. 1-10. ill. Includes references. (NAL Call No.: DNAL SB951.P49).

1012

Effects of dimethazone (FMC 57020) on chloroplast development. II. Pigment synthesis and photosynthetic function in cowpea (Vigna unguiculata L.) primary leaves.
PCBPB. Duke, S.O. Kenyon, W.H. Duluth, Minn. : Academic Press. Pesticide biochemistry and physiology. Feb 1986. v. 25 (1). p. 11-18. Includes references. (NAL Call No.: DNAL SB951.P49).

1013

Effects of hydrogen fluoride on growth, common blight development, and the accumulation of fluoride in field-grown red kidney beans.
PHYTAJ. Reynolds, K.L. Ithaca, NY; Laurence, J.A. St. Paul, Minn. : American Phytopathological Society. Field-grown California Light Red Kidney bean plants were spray-inoculated with a suspension of rifampin-resistant Xanthomonas campestris pv. phaseoli and exposed intermittently to hydrogen fluoride (HF) at 0,2, or 4 micrograms F m-3 in open-top chambers during the summers of 1984 or 1985. Plants were exposed for 8 hr day-1,2 days each week for 9 wk in 1984 or for 8 hr day-1, 4 days each week for 10 wk in 1985. Foliar accumulation of fluoride, disease severity, and epiphytic populations of the pathogen and other (unidentified) leaf surface microorganisms were determined weekly. The area under disease progress curve and final disease severity were not affected by exposure to HF, but the apparent infection rate increased with an increase in concentration HF in 1985. There was no effect of exposure to HF on growth of epiphytic populations of the pathogen or on the populations of other epiphytic bacteria during either year. However, in both years the growth rate of fungal populations increased with an increase in concentration of HF. Yield was not affected by HF in 1984 but decreased with an increase in concentration of fluoride in foliar tissues in 1985. Phytopathology. Sept 1988. v. 78 (9). p. 1168-1173. Includes references. (NAL Call No.: DNAL 464.8 P56).

1014

Effects of inhibitors and herbicides on the membrane potential of mung bean mitochondria.
PCBPB. Moreland, D.E. Novitzky, W.P. Duluth, Minn. : Academic Press. Pesticide biochemistry and physiology. July 1988. v. 31 (3). p. 247-260. Includes references. (NAL Call No.: DNAL SB951.P49).

1015

Effects of ozone and peroxyacetyl nitrate on polar lipids and fatty acids in leaves of morning glory and kidney bean.
PLPHA. Nouchi, I. Toyama, S. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. July 1988. v. 87 (3). p. 638-646. Includes references. (NAL Call No.: DNAL 450 P692).

1016

Effects of paclobutrazol on GA biosynthesis and fatty acid composition--a case study on the differential sensitivity to SO2 stress in snap bean (Phaseolus vulgaris L.) plants.
PPGGD. Lee, E.H. Saftner, R.A.; Wilding, S.J.; Clark, H.D.; Rowland, R.A. Lake Alfred, Fla. : The Society. Proceedings annual meeting - Plant Growth Regulator Society of America. 1987. (14th). p. 295-302. Includes references. (NAL Call No.: DNAL SB128.P5).

1017

Effects of plant density and late-season defoliation on yield of field beans.
EVETEX. Capinera, J.L. Horton, D.R.; Epsky, N.D.; Chapman, P.L. College Park, Md. : Entomological Society of America. Environmental entomology. Feb 1987. v. 16 (1). p. 274-280. Includes references. (NAL Call No.: DNAL QL461.E532).

1018

Efficacy and lentil tolerance of pyridate and pyridate / methazole.
Prather, T.S. Callihan, R.H.; Lopez, R.L.; Thill, D.C. S.l. : The Society. Research progress report - Western Society of Weed Science. 1988. p. 263. (NAL Call No.: DNAL 79.9 W52R).

1019

Efficacy of XE-1019 as a phytoprotectant against SO2 injury in snap bean.
PPGGD. Ku, J.H. Krizek, D.T.; Mirecki, R.M.; Lee, E.H. Lake Alfred, Fla. : The Society. Proceedings annual meeting - Plant Growth Regulator Society of America. 1987. (14th). p. 304-311. Includes references. (NAL Call No.: DNAL SB128.P5).

1020

Efficacy, phytotoxicity, soil residual of imazathepyr on peas and lima beans.
PNWSB. Kee, E. Rider, L. College Park, Md. : The Society. Proceedings of the annual meeting - Northeastern Weed Science Society. Meeting held January 6, 7 & 8, 1988 in Hartford, Connecticut. 1988. v. 42. p. 191-198. Includes references. (NAL Call No.: DNAL 79.9 N814).

1021

Evaluation of salt tolerance in cowpea and tobacco: effects of NaCl on growth, relative turgidity and photosynthesis.
JPNUDS. Kannan, S. Ramani, S. New York, N.Y. : Marcel Dekker. Journal of plant nutrition. Apr 1988. v. 11 (4). p. 435-448. ill. Includes references. (NAL Call No.: DNAL QK867.J67).

1022

A field technique for screening for genotypic differences in root growth.
CRPSAY. Robertson, B.M. Hall, A.E.; Foster, K.W. Madison, Wis. : Crop Science Society of America. Crop science. Nov/Dec 1985. v. 25 (6). p. 1084-1090. Includes references. (NAL Call No.: DNAL 64.8 C883).

1023

Flagellar motility confers epiphytic fitness advantages upon Pseudomonas syringae.
APMBA. Haefele, D.M. Lindow, S.E. Washington, D.C. : American Society for Microbiology. Applied and Environmental microbiology. Oct 1987. v. 53 (10). p. 2528-2533. Includes references. (NAL Call No.: DNAL 448.3 AP5).

1024

Generation mean analysis of beans Phaseolus vulgaris L. to O3 inheritance.
Mebrahtu, T. Rangappa, M.; Chappelka, A.H.; Robbins, E.; Benepal, P.S. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1988. v. 31. p. 110-111. Includes references. (NAL Call No.: DNAL SB327.A1B5).

1025

Growth and biomass partitioning in zinc-toxic bush beans.
JPNUDS. Ruano, A. Poschenrieder, C.; Barcelo, J. New York, N.Y. : Marcel Dekker. Journal of plant nutrition. May 1988. v. 11 (5). p. 577-588. Includes references. (NAL Call No.: DNAL QK867.J67).

1026

Heat tolerance and pod set in green beans.
JOSHB. Dickson, M.H. Petzoldt, R. Alexandria, Va. : The Society. Heat at any growth stage can damage green beans (Phaseolus vulgaris L.), but plants are most susceptible at or near bloom. The effect of heat during the bloom period resulted in reduction of a yield in proportion to the duration of the heat period. The most critical growth stage was found to be 2 to 3 days before anthesis, rather than at anthesis itself. By subjecting F1 plants to heat during the bloom period, genetic selection for heat tolerance was moderately effective. The heritability for heat tolerance was quite low. Broad-sense heritability was 19% to 79% and narrow-sense heritability 0% to 14%. The values are probably conservative, since during the genetic study the heat period was initiated on the first day of bloom, which resulted in some escapes and excess variability. Journal of the American Society for Horticultural Science. Sept 1989. v. 114 (5). p. 833-836. Includes references. (NAL Call No.: DNAL 81 SO12).

1027

Herbicidal effects of fomesafen.
PNWSB. Devlin, R.M. Koszanski, Z.K. College Park, Md. : The Society. Proceedings of the annual meeting - Northeastern Weed Science Society. Meeting held January 6, 7 & 8, 1988 in Hartford, Connecticut. 1988. v. 42. p. 67-72. Includes references. (NAL Call No.: DNAL 79.9

N814).

1028

Ice nucleation temperature of individual leaves in relation to population sizes of ice nucleation active bacteria and frost injury.
PLPHA. Hirano, S.S. Baker, L.S.; Upper, C.D. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Feb 1985. v. 77 (2). p. 259-265. ill. Includes 25 references. (NAL Call No.: DNAL 450 P692).

1029

Imbibitional chilling injury tolerance in semi-hard seeds.
Taylor, A.G. Dickson, M.H. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. Mar 1986. v. 29. p. 101-102. Includes references. (NAL Call No.: DNAL SB327.A1B5).

1030

Imbibitional stress and transverse cracking of bean, pea, and chickpea, cotyledons.
HJHSA. Spaeth, S.C. Alexandria, Va. : American Society for Horticultural Science. HortScience. Feb 1986. v. 21 (1,section 1). p. 110-111. ill. Includes references. (NAL Call No.: DNAL SB1.H6).

1031

Increased 8-hydroxyguanine content of chloroplast DNA from ozone-treated plants.
PLPHA. Floyd, R.A. West, M.S.; Hogsett, W.E.; Tingey, D.T. Rockville, Md. : American Society of Plant Physiologists. The mechanism of ozone-mediated plant injury is not known but has been postulated to involve oxygen free radicals. Hydroxyl free radicals react with DNA causing formation of many products, one of which is 8-hydroxyguanine. By using high preformance liquid chromatography with electrochemical detection, the 8-hydroxy-2'-deoxyguanosine (8-OHdG) content of a DNA enzymatic digest can be sensitively quantitated. Beans (Phaseolus vulgaris L.) and peas (Pisum sativum L.) were treated with an ozone regime that caused acute injury. Chloroplast DNA was obtained from plants harvested either immediately after ozone treatment or 24 hours later. Ozone-exposed plants in general had nearly two-fold higher levels of 8-OHdG as compared to control plants. In vito treatment of DNA in buffer solution with ozone did not cause formation of 8-OHdG in DNA, even though ozone did react directly with the macromolecule per se. Exposure of isolated, illuminated chloroplasts to ozone caused nearly a seven-fold increase in the amount of 8-OHdG in the chloroplast DNA as compared to none-ozone-exposed chloroplasts. These results suggest that ozone exposure to plants causes formation of enhanced levels of oxygen free radicals, thus mediating formation of 8-OHdG in chloroplast DNA. The reaction of ozone with DNA per se did not cause formation of 8-OHdG. Therefore, it is the interaction of ozone with plant cells and isolated chloroplasts which mediates oxygen free radical formation. Plant physiology. Oct 1989. v. 91 (2). p. 644-647. Includes references. (NAL Call No.: DNAL 450 P692).

1032

The influence of acid factors on the growth of snapbeans major appalachian soils.
CSOSA2. Wright, J.R. Baligar, V.C.; Wright, S.F. New York, N.Y. : Marcel Dekker. Communications in soil science and plant analysis. Nov 1987. v. 18 (11). p. 1235-1252. Includes references. (NAL Call No.: DNAL S590.C63).

1033

Influence of short periods of heat stress on nitrogen fixation and growth of Phaseolus vulgaris L.
Hernandez-Armenta, R. Wien, H.C.; Eaglesham, A.R.J. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1987. v. 30. p. 50-51. Includes references. (NAL Call No.: DNAL SB327.A1B5).

1034

Influence of water stress on nitrogen fixation in cowpea.
JOSHB. Walker, D.W. Miller, J.C. Jr. Alexandria, Va. : The Society. Journal of the American Society for Horticultural Science. May 1986. v. 111 (3). p. 451-458. Includes references. (NAL Call No.: DNAL 81 S012).

1035

Inheritance study of common bean, Phaseolus vulgaris L. to ambient O3 injury.
Mebrahtu, T. Rangappa, M.; Benepal, P.S. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1988. v. 31. p. 108-109. Includes references. (NAL Call No.: DNAL SB327.A1B5).

1036

Inhibition of corn acetyl-CoA carboxylase by cyclohexanedione and aryloxyphenoxypropionate herbicides.
PCBPB. Burton, J.D. Gronwald, J.W.; Somers, D.A.; Gengenbach, B.G.; Wyse, D.L. Duluth, Minn. : Academic Press. Pesticide biochemistry and physiology. May 1989. v. 34 (1). p. 76-85. Includes references. (NAL Call No.: DNAL

SB951.P49).

1037

Inhibition of the K+-stimulated ATPase of the phasmalemma of pinto bean leaves by ozone.
PLPHA. Dominy, P.J. Heath, R.L. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Jan 1985. v. 77 (1). p. 43-45. ill. Includes 15 references. (NAL Call No.: DNAL 450 P692).

1038

Inhibitory effect of pseudobactin on the uptake of iron by higher plants.
APMBA. Becker, J.O. Hedges, R.W.; Messens, E. Washington, D.C. : American Society for Microbiology. Applied and environmental microbiology. May 1985. v. 49 (5). p. 1090-1093. ill. Includes 25 references. (NAL Call No.: DNAL 448.3 AP5).

1039

Lentil harvesting losses in the Palouse.
Moden, W.L. Jr. Dowding, E.A.; Whitcraft, J.C.; O'Keefe, L.E. St. Joseph, Mich. : The Society. American Society of Agricultural Engineers (Microfiche collection). Paper presented at the 1986 Winter Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St. Joseph, Michigan 49085. Telephone the Order Dept. at (616) 429-0300 for information and prices. 1986. (fiche no. 86-1580). 12 p. Includes references. (NAL Call No.: DNAL FICHE S-72).

1040

Lipid peroxidation in higher plants: The role of glutathione reductase.
PLPHA. Schmidt, A. Kunert, K.J. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Nov 1986. v. 82 (3). p. 700-702. Includes references. (NAL Call No.: DNAL 450 P692).

1041

Measuring ozone sensitivity of white bean using digitized video image analysis.
Michaels, T.E. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. Mar 1986. v. 29. p. 20-21. (NAL Call No.: DNAL SB327.A1B5).

1042

Mechanism of manganese toxicity and tolerance of plants. VII. Effect of light intensity on manganese-induced chlorosis.
JPNUDS. Horiguchi, T. New York, N.Y. : Marcel Dekker. Journal of plant nutrition. Mar 1988. v. 11 (3). p. 235-246. ill. Includes references. (NAL Call No.: DNAL QK867.J67).

1043

Mechanisms of selective action of sodium sulfanilate on plants.
PCBPB. Zhang, L.H. Lin, K.H. Duluth, Minn. : Academic Press. Pesticide biochemistry and physiology. Sept 1988. v. 32 (1). p. 11-16. Includes references. (NAL Call No.: DNAL SB951.P49).

1044

Metabolic basis for injury to plants from combinations of O3 and SO2. Studies with modifiers of pollutant toxicity.
PLPHA. Olszyk, D.M. Tingey, D.T. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Apr 1985. v. 77 (4). p. 935-939. Includes 26 references. (NAL Call No.: DNAL 450 P692).

1045

Metribuzin tolerance in chickpeas.
Prather, T.S. Callihan, R.H.; Thill, D.C. S.l. : Western Society of Weed Science. Research progress report - Western Society of Weed Science. 1987. p. 228. (NAL Call No.: DNAL 79.9 W52R).

1046

Metribuzin tolerance within the genus Vigna.
WETEE9. Harrison, H.F. Jr. Champaign, Ill. : The Society. Weed technology : a journal of the Weed Science Society of America. Jan 1988. v. 2 (1). p. 59-63. Includes references. (NAL Call No.: DNAL SB610.W39).

1047

Napropamide stress-induced polyamine accumulation in pea root tips.
DiTomaso, J.M. Rost, T.L.; Ashton, F.M. Sacramento, Calif. : California Weed Conference Office. Proceedings - California Weed Conference. 1987. (39th). p. 30. (NAL Call No.: DNAL 79.9 C122).

1048

Oxyfluorfen: a candidate herbicide for weed control in pigeon peas.
JAUPA. Semidey, N. Almodovar, L. Mayaguez : University of Puerto Rico, Agricultural Experiment Station. The Journal of agriculture of the University of Puerto Rico. July 1987. v. 71 (3). p. 277-285. Includes references. (NAL Call No.: DNAL 8 P832J).

1049

Paclobutrazol induced sulfur dioxide, chiling, and high temperature tolerance in snap bean plants.
PPGGD. Lee, E.H. Byun J.K.; Wilding, S.J.; Steffens, G.L. Lake Alfred, Fla. : The Society. Proceedings of the Plant Growth Regulator Society of America. Meeting held on July 28-August 1, 1985, Boulder, Colorado.~ Includes abstract. 1985. (12th). p. 78. (NAL Call No.: DNAL SB128.P5).

1050

Product use, handling and storage considerations.
Slinkard, A.E. St. Paul, Minn. : Center for Alternative Crops and Products, University of Minnesota, 1987? . Grain legumes as alternative crops : a symposium / sponsored by the Center for Alternative Crops and Products, University of Minnesota, July 23-24, 1987. p. 151-156. Includes references. (NAL Call No.: DNAL SB317.L43G73).

1051

R-25788 effects on chlorsulfuron injury and acetohydroxyacid synthase activity.
WEESA6. Rubin, B. Casida, J.E. Champaign, Ill. : Weed Science Society of America. Weed science. July 1985. v. 33 (4). p. 462-468. Includes 24 references. (NAL Call No.: DNAL 79.8 W41).

1052

Relationship between thermal transitions and freezing injury in pea and soybean seeds.
PLPHA. Vertucci, C.W. Rockville, Md. : American Society of Plant Physiologists. In attempt to correlate freezable water with freezing injury, the thermal behavior of pea (Pisum sativum L.) and soybean (Glycine max L. Merr) seed parts at different moisture contents were compared with survival of the seeds when exposed to low temperatures. Thermal transitions between -150 and 10 degrees C were studied using differential scanning calorimetry. In pea, reduction of germinability, after exposure of seeds to temperatures between -18 and -180 degrees C, ocurred at a constant moisture content (about 0.33 gram H2O/gram dry weight) regardless of the temperature; this moisture level was above that at which freezable water was first detectable by differential scanning calorimetry (0.26 gram H2O/gram dry weight). In contrast, damage to soybean seeds was observed at progressively lower moisture contents (from 0.33 to 0.20 gram H2O/gram dry weight) when the temperature was decreased from -18 degrees C to -50 degrees C. AT -18 and -30 degrees C, moisture contents at which damage to soybean seeds was evident were above that at which freezable water was first detectable (0.23 gram H2O/gram dry weight). However, at -50, -80, and -180 degrees C, damage was evident even when freezable water was not detectable. The data suggest that, while the quantity of water is important in the expression of freezing injury, the presence of freezable water does not account for the damage. Plant physiology. July 1989. v. 90 (3). p. 1121-1128. Includes references. (NAL Call No.: DNAL 450 P692).

1053

The relationship of Xanthomonas campestris pv. translucens to frost and the effect of frost on black chaff development in wheat.
PHYTAJ. Azad, H. Schaad, N.W. St. Paul, Minn. : American Phytopathological Society. Phytopathology. Jan 1988. v. 78 (1). p. 95-100. Includes references. (NAL Call No.: DNAL 464.8 P56).

1054

Residual effect of metsulfuron applied during the fallow year on barley and lentils.
Mashhadi, H.R. Evans, J.O. S.l. : The Society. Research progress report - Western Society of Weed Science. 1988. p. 258-259. (NAL Call No.: DNAL 79.9 W52R).

1055

Response of beans to simulated ambient and uniform ozone distributions with equal peak concentration.
JOSHB. Musselman, R.C. Huerta, A.J.; McCool, P.M.; Oshima, R.J. Alexandria, Va. : The Society. Journal of the American Society for Horticultural Science. May 1986. v. 111 (3). p. 470-473. Includes references. (NAL Call No.: DNAL 81 S012).

1056

Root distribution of dry bean under drought stress.
Hoogenboom, G. Boote, K.J.; Jones, J.W. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1988. v. 31. p. 168-169. Includes references. (NAL Call No.: DNAL SB327.A1B5).

1057

Salinity tolerance of winged bean as compared to that of soybean.
AGJOAT. Weil, R.R. Khalil, N.A. Madison, Wis. : American Society of Agronomy. Agronomy journal. Jan/Feb 1986. v. 78 (1). p. 67-70. Includes 16 references. (NAL Call No.: DNAL 4 AM34P).

1058

Salt stress results in ammonia intoxication of Phaseolus acutifolius A. Gray.
Lazcano-Ferrat, I. Lovatt, C.J. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1988. v. 31. p. 112-113. Includes references. (NAL Call No.: DNAL SB327.A1B5).

1059

Scanning electron microscopy of damage by dust deposits to leaves and petals.
BOGAA. Eveling, D.W. Chicago, Ill. : University of Chicago Press. Botanical gazette. June 1986. v. 147 (2). p. 159-165. ill. Includes references. (NAL Call No.: DNAL 450 B652).

1060

Seasonal population changes and characterization of ice-nucleating bacteria in farm fields of central Alberta.
APMBA. Kaneda, T. Washington, D.C. : American Society for Microbiology. Applied and environmental microbiology. July 1986. v. 52 (1). p. 173-178. Includes 25 references. (NAL Call No.: DNAL 448.3 AP5).

1061

Seed moisture and development of early planted cowpea.
Marsh, L. Jones, R. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1987. v. 30. p. 76-77. Includes references. (NAL Call No.: DNAL SB327.A1B5).

1062

Semi-automatic survey of crop damage using color infrared photography.
PERSD. Ladouceur, G. Allard, R.; Ghosh, S. Falls Church, Va. : American Society of Photogrammetry and Remote Sensing. Photogrammetric engineering and remote sensing. Jan 1986. v. 52 (1). p. 111-115. ill. Includes references. (NAL Call No.: DNAL 325.28 P56).

1063

Sensitivity of fieldbeans (Phaseolus vulgaris) to reduced rates of 2,4-D and dicamba.
WEESA6. Lyon, D.J. Wilson, R.G. Champaign, Ill. : Weed Science Society of America. Weed science. Nov 1986. v. 34 (6). p. 953-956. Includes references. (NAL Call No.: DNAL 79.8 W41).

1064

Soil compaction losses in pinto beans.
Croissant, R.L. Schwartz, H.F.; Ayers, P.D. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1988. v. 31. p. 58-59. Includes references. (NAL Call No.: DNAL SB327.A1B5).

1065

Some physiological effects of AC-252,214 on several plant growth systems.
PNWSB. Devlin, R.M. Koszanski, Z.K. Beltsville, Md. : The Society. Proceedings of the ... annual meeting - Northeastern Weed Science Society. 1986. v. 40. p. 99-103. Includes references. (NAL Call No.: DNAL 79.9 N814).

1066

Stress ethylene formation determines plant sensitivity to ozone.
NATUAS. Mehlhorn, H. Wellburn, A.R. Neptune, N.J. : Macmillan Journals. Nature. June 4/10, 1987. v. 327 (6121). p. 417-418. Includes references. (NAL Call No.: DNAL 472 N21).

1067

Studies on octylphenoxy surfactants. V. Toxicity to cowpea leaves and effects of spray application parameters.
JOSHB. Lownds, N.K. Bukovac, M.J. Alexandria, Va. : The Society. Journal of the American Society for Horticultural Science. Mar 1988. v. 113 (2). p. 205-210. ill. Includes references. (NAL Call No.: DNAL 81 SO12).

1068

Use of Alcaligenes eutrophus as a source of genes for 2,4-D resistance in plants.
WEESA6. Perkins, E.J. Stiff, C.M.; Lurquin, P.F. Champaign, Ill. : Weed Science Society of America. Weed science. Paper presented at the "Symposium on Genetic Engineering for Herbicide Resistance," Feb. 1985. 1987. v. 35 (Suppl.1). p. 12-18. Includes references. (NAL Call No.: DNAL 79.8 W41).

1069

Using plants to monitor air pollution.
Simon, J.E. Simini, M.; Decoteau, D.R. West Lafayette, Ind. : The Service. HO - Purdue University, Cooperative Extension Service. Jan 1986. (195). 3 p. ill. Includes references. (NAL Call No.: DNAL SB21.I6P8).

1070

Vanadium induced manganese toxicity in bush bean plants grown in solution culture.
JPNUDS. Kohno, Y. New York, N.Y. : Marcel Dekker. Journal of plant nutrition. Oct 1986. v. 9 (10). p. 1261-1272. Includes references. (NAL Call No.: DNAL QK867.J67).

1071

Water stress reduces ozone injury via a stomatal mechanism.
PLPHA. Tingey, D.T. Hogsett, W.E. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Apr 1985. v. 77 (4). p. 944-947. Includes 24 references. (NAL Call No.: DNAL 450 P692).

1072

Weed control in spring peas.
Prather, T.S. Callihan, R.H.; Thill, D.C. S.l. : The Society. Research progress report - Western Society of Weed Science. 1988. p. 264-266. (NAL Call No.: DNAL 79.9 W52R).

1073

Zinc toxicity-induced variation of mineral element composition in hydroponically grown bush bean plants.
JPNUDS. Ruano, A. Barcelo, J.; Poschenrieder, C. New York, N.Y. : Marcel Dekker. Journal of plant nutrition. Mar 1987. v. 10 (4). p. 373-384. Includes references. (NAL Call No.: DNAL QK867.J67).

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1074

Oxidative processes in soybean and pea seeds. Effect of light, temperature, and water content.
PLPHA. Vertucci, C.W. Leopold, A.C. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Aug 1987. v. 84 (4). p. 1038-1043. Includes references. (NAL Call No.: DNAL 450 P692).

1075

Artificial seed system for bioassay of cowpea weevil (Coleoptera: Bruchidae) growth and development.
EVETEX. Shade, R.E. Murdock, L.L.; Foard, D.E.; Pomeroy, M.A. College Park, Md. : Entomological Society of America. Environmental entomology. Dec 1986. v. 15 (6). p. 1286-1291. ill. Includes references. (NAL Call No.: DNAL QL461.E532).

1076

Biological activities of hexane extract of Piper cubeba against rice weevils and cowpea weevils (Coleoptera: Curculionidae).
JESCEP. Su, H.C.F. Tifton, Ga. : Georgia Entomological Society. Journal of entomological science. Jan 1990. v. 25 (1). p. 16-20. Includes references. (NAL Call No.: DNAL QL461.G4).

1077

The biology of bean bruchid beetle (Acanthoscelides obtectus Say) feeding on mature seed of tepary bean and common bean.
Shade, R.E. Pratt, R.C. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. Mar 1986. v. 29. p. 45-46. Includes references. (NAL Call No.: DNAL SB327.A1B5).

1078

Bruchid resistance in cowpea.
CRPSAY. Singh, B.B. Singh, S.R.; Adjadi, O. Madison, Wis. : Crop Science Society of America. Crop science. Sept/Oct 1985. v. 25 (5). p. 736-739. ill. Includes references. (NAL Call No.: DNAL 64.8 C883).

1079

Effects of E-64, a cysteine proteinase inhibitor, on cowpea weevil growth, development, and fecundity.
EVETEX. Murdock, L.L. Shade, R.E.; Pomeroy, M.A. College Park, Md. : Entomological Society of America. Abstract: E-64, a specific inhibitor of cysteine proteinases, was incorporated into artificial seeds at low levels (0.01-0.25% by weight). It prolonged developmental time and increased mortality of the larval cowpea weevil, Callosobruchus maculatus (F.), in direct proportion to its concentration in the artificial seeds. The fecundity of females emerging from the artificial seeds was significantly decreased by E-64 concentrations of 0.06% and higher. These observations are compatible with the hypothesis that the midgut cysteine proteinase in C. maculatus is essential for normal growth and development. Environmental entomology. June 1988. v. 17 (3). p. 467-469. Includes references. (NAL Call No.: DNAL QL461.E532).

1080

Genotypic diversity in the suitability of cowpea (Rosales: Leguminosae) pods and seeds for cowpea weevil (Coleoptera: Bruchidae) oviposition and development.
JEENAI. Fitzner, M.S. Hagstrum, D.W.; Knauft, D.A.; Buhr, K.L.; McLaughlin, J.R. College Park, Md. : Entomological Society of America. Journal of economic entomology. Aug 1985. v. 78 (4). p. 806-810. Includes references. (NAL Call No.: DNAL 421 J822).

1081

Inheritance of bruchid resistance in cowpea.
CRPSAY. Adjadi, O. Singh, B.B.; Singh, S.R. Madison, Wis. : Crop Science Society of America. Crop science. Sept/Oct 1985. v. 25 (5). p. 740-742. Includes references. (NAL Call No.: DNAL 64.8 C883).

1082

Insect pests of cowpeas.
ARENA. Jackai, L.E.N. Daoust, R.A. Palo Alto : Annual Reviews Inc. Annual review of entomology. Literature review. 1986. v. 31. p. 95-119. Includes references. (NAL Call No.: DNAL 421 AN72).

1083

Intraspecific variation in the egg-spacing behavior of the seed beetle Callosobruchus maculatus.
JIBEE8. Messina, F.J. Mitchell, R. New York, N.Y. : Plenum Publishing. Journal of insect behavior. Nov 1989. v. 2 (6). p. 727-742. Includes references. (NAL Call No.: DNAL QL496.J68).

1084

Additions to host range of Colletotrichum gloeosporioides f. sp. aeschynomene.
PLDIDE. TeBeest, D.O. St. Paul, Minn. : American Phytopathological Society. Plant disease. Jan 1988. v. 72 (1). p. 16-18. ill. Includes references. (NAL Call No.: DNAL 1.9 P69P).

1085

Bentazon and bentazon/MCPB tank mixes for weed control in English pea.
PNWSB. Porter, G.A. Bellinder, R.R.; Morrow, L.S.; Warholic, D.T.; Ashley, R.A.; Mascianica, M.P. College Park, Md. : The Society. Proceedings of the annual meeting - Northeastern Weed Science Society. Meeting held January 6, 7 & 8, 1988 in Hartford, Connecticut. 1988. v. 42. p. 235-242. Includes references. (NAL Call No.: DNAL 79.9 N814).

1086

Canada thistle and perennial sowthistle--two problem perennial weeds in Michigan.
Renner, K.A. Zollinger, R.K. Saginaw, Mich. : The Digest. Michigan dry bean digest. Summer 1988. v. 12 (4). p. 6-7. ill. (NAL Call No.: DNAL SB327.M52).

1087

Chlorsulfuron inhibition of cell cycle progression and the recovery of G1 arrested cells by Ile and Val.
JPGRDI. Robbins, J. Rost, T.L. New York, N.Y. : Springer. Journal of plant growth regulation. 1987. v. 6 (2). p. 67-74. Includes references. (NAL Call No.: DNAL QK745.J6).

1088

Combinations of sethoxydim (Poast) herbicide with insecticides and a fungicide for snap beans.
Mullins, C.A. Shamiyeh, N.B. Fort Collins, Colo : Howard F. Schwartz, Colorado State University. Annual report of the Bean Improvement Cooperative. 1989. v. 32. p. 83. (NAL Call No.: DNAL SB327.A1B5).

1089

Commercial lima bean production.
Binning, L.K. Wyman, J.A.; Bundy, L.G.; Stevenson, W.R. Madison, Wis. : The Programs. Publication - Cooperative Extension Programs. University of Wisconsin - Extension. Jan 1985. (A2338). 4 p. (NAL Call No.: DNAL S544.3.W6W53).

1090

Common ragweed interference in snap beans at various soil potassium levels.
AAREEZ. Evanylo, G.K. Zehnder, G.W. New York, N.Y. : Springer. Effects of interference of common ragweed (Ambrosia artemisiifolia L.) and herbicide control (Trifluralin) at various soil K levels on yield and nutrient uptake by snap beans (Phaseolus vulgaris L. "Provider") were investigated in field studies. Trifluralin produced no significant effects upon snap bean dry matter production, fresh market pod yields, or pod nutrient accumulation. Competition from common ragweed from seeding to flowering (30 days) and for the full season (50 days) decreased snap bean pod yields by 30 and75%, respectively. Yield reduction in the presence of common ragweed up to flowering was related to decreased leaf dry matter production. Snap bean pod yields and nutrient accumulation were increased with K fertilization when only full-season weed competition occurred. Potassium fertilizer adjustments based on subsoil K levels may be beneficially applied to snap beans. Applied agricultural research. Spring 1989. v. 4 (2). p. 101-105. Includes references. (NAL Call No.: DNAL S539.5.A77).

1091

Control of grass weeds in dry peas.
Whitesides, R.E. Swan, D.G. S.l. : Western Society of Weed Science. Research progress report - Western Society of Weed Science. 1986. p. 165. (NAL Call No.: DNAL 79.9 W52R).

1092

Controlling wild proso millet (Panicum miliaceum L.) in snapbeans.
McGrath, D.M. Diener, P.; Braunworth, W.S. Jr.; Crabtree, G. S.l. : The Society. Research progress report - Western Society of Weed Science. 1988. p. 105-106. (NAL Call No.: DNAL 79.9 W52R).

1093

Cowpea control in soybeans with chlorimuron ethyl and DPX-M6316.
SWSPBE. Jones, J.D. Gossett, B.J.; Harris, J.R.; Toler, J.E. Raleigh, N.C. : The Society . Proceedings - Southern Weed Science Society. Paper presented at the "Meeting on Environmental Legislation and its Effects on Weed Science," Jan 18/20, 1988, Tulsa, Oklahoma. 1988. v. 41. p. 49. (NAL Call No.: DNAL 79.9 S08 (P)).

1094

Dicamba, chlorsulfuron, and clopyralid as sprayer contaminants on sunflower (Helianthus annuus), mustard (Brassica juncea), and lentil (Lens culinaris), respectively.
WEESA6. Derksen, D.A. Champaign, Ill. : Weed Science Society of America. Simulated sprayer tank residues of the broadleaf weed herbicides dicamba, chlorsulfuron, and clopyralid applied alone and with the grass weed herbicides sethoxydim and diclofop on sunflower, tame mustard, and lentil, respectively, caused visible crop injury and reduced dry weight and yield. Dry weight production in the greenhouse and crop tolerance ratings in the field indicated that the grass weed herbicides enhanced crop injury from dicamba, chlorsulfuron, and clopyralid. Yield reductions in field experiments were also greater when dicamba and clopyralid were mixed with grass weed herbicides and applied on sunflower and lentil, respectively. This did not occur with chlorsulfuron applied to mustard. When mixed with simulated broadleaf weed herbicide residues, diclofop enhanced dry weight reductions and crop injury and reduced yield to a greater extent than sethoxydim. Crop tolerance ratings differentiated treatments and rates but were not a good estimate of the extent of yield loss. When broadleaf weed herbicides were applied at rates simulating sprayer tank residues alone or combined with grass weed herbicides, yield losses ranged up to 40% in sunflower, 70% in mustard, and 95% in lentil, compared to the untreated check. Weed science. July 1989. v. 37 (4). p. 616-621. Includes references. (NAL Call No.: DNAL 79.8 W41).

1095

DPX-Y6202 for wild oats control in lentils.
Curran, W.S. Whitesides, R.E.; Morrow, L.A. S.l. : Western Society of Weed Science. Research progress report - Western Society of Weed Science. 1986. p. 161-162. (NAL Call No.: DNAL 79.9 W52R).

1096

Economic analysis of four weed management systems.
WEESA6. Lybecker, D.W. Schweizer, E.E.; King, R.P. Champaign, Ill. : Weed Science Society of America. An economic analysis of four weed management systems employed on four crop sequences in a barley-corn-pinto bean-sugarbeet rotation in eastern Colorado was computed. Weeds were controlled in each crop with only conventional tillage or conventional tillage plus minimum levels of herbicide (systems 3 and 4), moderate levels of herbicides (system 1), or intensive levels of herbicides (system 2). Adjusted gross returns were higher for systems 3 and 4 where herbicide use was less/year and decreased over 4 yr than for systems 1 and 2 where herbicide use was higher/year and constant. When the four crop sequences were aggregated using yield and sucrose indices, the least herbicide-intensive weed management system had $440/ha/4 yr higher indexed adjusted gross return than the most herbicide-intensive weed managment system. An income risk analysis showed that the herbicide-intensive weed management system was not risk efficient and that producers would select one of the other three less herbicide-intensive weed management systems depending upon their risk preferences. Weed science. Nov 1988. v. 36 (6). p. 846-849. Includes references. (NAL Call No.: DNAL 79.8 W41).

1097

Economic losses and control of nightshade in dry beans.
Mitich, L.W. Kyser, G.B. Sacramento, Calif. : California Weed Conference Office. Proceedings - California Weed Conference. 1986. (38th). p. 128-135. Includes references. (NAL Call No.: DNAL 79.9 C122).

1098

Edible bean herbicide demonstration.
Wrage, L.J. Johnson, P.O.; Arnold, W.E. Brookings, S.D. : The Station. Plant science pamphlet - Plant Science Dept., Agricultural Experiment Station, South Dakota State University. In the series analytic: 1986 Annual progress report, Northeast Research Station, Watertown, South Dakota. Jan 1987. (100). p. 59-60. (NAL Call No.: DNAL S541.5.S8P5).

1099

Effect of nightshade competition on yield of kidney beans.
Mitich, L.W. Smith, N.L.; Szelezniak, E.F.; Kyser, G.B. S.l. : Western Society of Weed Science. Research progress report - Western Society of Weed Science. 1986. p. 149-150. (NAL Call No.: DNAL 79.9 W52R).

1100

Effectiveness of preplant incorporated herbicides for weed control in 'California Dark Red' kidney beans.
Mitich, L.W. Smith, N.L.; Szelezniak, E.F.; Kyser, G.B. S.l. : Western Society of Weed Science. Research progress report - Western Society of Weed Science. 1986. p. 143-144. (NAL Call No.: DNAL 79.9 W52R).

1101

Effects of herbicides on root rot of pinto bean, weeds, and two soilborne fungi.
PLDRA. Gilbertson, R.L. Ruppel, E.G.; Schweizer, E.E. St. Paul, Minn. : American Phytopathological Society. Plant disease. July 1987. v. 71 (7). p. 627-629. Includes

references. (NAL Call No.: DNAL 1.9 P69P).

1102

Efficacy and lentil tolerance of pyridate and pyridate / methazole.
Prather, T.S. Callihan, R.H.; Lopez, R.L.; Thill, D.C. S.l. : The Society. Research progress report - Western Society of Weed Science. 1988. p. 263. (NAL Call No.: DNAL 79.9 W52R).

1103

Efficacy of two isomers of DPX-6202 on wild oat and spring peas.
Prather, T.S. Callihan, R.H.; Thill, D.C. S.l. : Western Society of Weed Science. Research progress report - Western Society of Weed Science. 1987. p. 227. (NAL Call No.: DNAL 79.9 W52R).

1104

Enhanced soil degradation of butylate and EPTC in Nebraska fields.
WETEE9. Roeth, F.W. Wilson, R.G.; Martin, A.R.; Shea, P.J. Champaign, Ill. : The Society. Weed technology : a journal of the Weed Science Society of America. Jan/Mar 1989. v. 3 (1). p. 24-29. Includes references. (NAL Call No.: DNAL SB610.W39).

1105

Evaluation of bentazon tank mixes for weed control in dry bean.
Kidder, D.W. S.l. : Western Society of Weed Science. Research progress report - Western Society of Weed Science. 1987. p. 184-185. (NAL Call No.: DNAL 79.9 W52R).

1106

Evaluation of herbicide treatments for no-till snap bean production.
Mullins, C.A. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. Mar 1985. v. 28. p. 111-113. (NAL Call No.: DNAL SB327.A1B5).

1107

Evaluation of new herbicides in snap beans.
TFHSA. Mullins, C.A. Rhodes, G.N. Jr. Knoxville, Tenn. : The Station. Tennessee farm and home science : progress report - Tennessee Agricultural Experiment Station. Spring 1988. (146). p. 13-15. Includes references. (NAL Call No.: DNAL 100 T25F).

1108

Evaluation of postemergence herbicides for crop phytotoxicity and control of selected weeds in kidney beans.
Canevari, W.M. Mitich, L.W.; Kyser, G.B. S.l. : Western Society of Weed Science. Research progress report - Western Society of Weed Science. 1986. p. 147-148. (NAL Call No.: DNAL 79.9 W52R).

1109

Evaluation of postemergence herbicides for the control of selected weeds in 'California Dark Red' kidney beans.
Mitich, L.W. Smith, N.L.; Szelezniak, E.F.; Kyser, G.B. S.l. : Western Society of Weed Science. Research progress report - Western Society of Weed Science. 1986. p. 145-146. (NAL Call No.: DNAL 79.9 W52R).

1110

Evaluation of postemergence herbicides in dry bean.
Kidder, D.W. Drummond, D.P. S.l. : The Society. Research progress report - Western Society of Weed Science. 1988. p. 223-224. (NAL Call No.: DNAL 79.9 W52R).

1111

Evaluation of preemergence herbicide treatments in pinto beans.
WAEBA. Miller, S.D. Laramie : The Station. Bulletin B - Wyoming, Agricultural Experiment Station. 1986. (885). p. 160-161. (NAL Call No.: DNAL 100 W99 (1)).

1112

Evaluation of preemergence herbicide treatments in pinto beans.
Miller, S.D. S.l. : Western Society of Weed Science. Research progress report - Western Society of Weed Science. 1987. p. 188-189. (NAL Call No.: DNAL 79.9 W52R).

1113

Evaluation of preemergence herbicides in pinto beans.
Miller, S.D. S.l. : Western Society of Weed Science. Research progress report - Western Society of Weed Science. 1986. p. 155. (NAL Call No.: DNAL 79.9 W52R).

1114

Evaluation of preemergence/postemergence and postemergence herbicides in pinto beans.
Miller, S.D. S.l. : Western Society of Weed Science. Research progress report - Western Society of Weed Science. 1986. p. 156. (NAL Call No.: DNAL 79.9 W52R).

1115

Evaluation of preplant incorporated herbicides for weed control and crop injury in 'Linden Red' kidney beans.
Mitich, L.W. Kyser, G.B. S.l. : Western Society of Weed Science. Research progress report - Western Society of Weed Science. 1987. p. 182-183. (NAL Call No.: DNAL 79.9 W52R).

1116

Evaluation of preplant incorporated herbicides in dry bean.
Kidder, D.W. Drummond, D.P. S.l. : The Society. Research progress report - Western Society of Weed Science. 1988. p. 221-222. (NAL Call No.: DNAL 79.9 W52R).

1117

Evaluation of preplant incorporated herbicides in pinto beans.
Miller, S.D. S.l. : Western Society of Weed Science. Research progress report - Western Society of Weed Science. 1986. p. 153-154. (NAL Call No.: DNAL 79.9 W52R).

1118

Evaluation of preplant incorporated or complementary preplant incorporated/preemergence treatments in pinto beans.
WAEBA. Miller, S.D. Laramie : The Station. Bulletin B - Wyoming, Agricultural Experiment Station. 1986. (885). p. 162-163. (NAL Call No.: DNAL 100 W99 (1)).

1119

Evaluation of preplant incorporated or complementary preplant incorporated/preemergence treatments in pinto beans.
Miller, S.D. S.l. : Western Society of Weed Science. Research progress report - Western Society of Weed Science. 1987. p. 186-187. (NAL Call No.: DNAL 79.9 W52R).

1120

Flurprimidol: plant response, translocation, and metabolism.
JOSHB. Sterrett, J.P. Tworkoski, T.J. Alexandria, Va. : The Society. Journal of the American Society for Horticultural Science. Mar 1987. v. 112 (3). p. 341-345. Includes references. (NAL Call No.: DNAL 81 S012).

1121

Graminicides for wild oat control in dry spring peas.
Huston, C.H. Callihan, R.H.; Thill, D.C. S.l. : Western Society of Weed Science. Research progress report - Western Society of Weed Science. 1986. p. 163-164. (NAL Call No.: DNAL 79.9 W52R).

1122

Herbicide evaluation of snapbean.
SWSPBE. Glaze, N.C. Raleigh, N.C. : The Society . Proceedings - Southern Weed Science Society. Paper presented at the "Meeting on Environmental Legislation and its Effects on Weed Science," Jan 18/20, 1988, Tulsa, Oklahoma.~ Includes abstract. 1988. v. 41. p. 130. (NAL Call No.: DNAL 79.9 S08 (P)).

1123

Herbicide evaluations in pinto beans.
Arnold, R.N. Gregory, E.J.; Price, W.J. S.l. : Western Society of Weed Science. Research progress report - Western Society of Weed Science. 1986. p. 151-152. (NAL Call No.: DNAL 79.9 W52R).

1124

Herbicide-treated crop seed.
Dawson, J.H. Champaign, Ill. : Weed Science Society of America. Monograph series of the Weed Science Society of America. In the series analytic: Methods of applying herbicides / edited by C.G. McWhorter and M.R. Gebhardt. 1987. (4). p. 255-263. ill. Includes references. (NAL Call No.: DNAL SB610.M65).

1125

In vitro activity of sorghum-selective fluorophenyl urea herbicides.
PCBPB. Gardner, G. Pilgram, K.H.; Brown, L.J.; Bozarth, G.A. Duluth, Minn. : Academic Press. Pesticide biochemistry and physiology. Dec 1985. v. 24 (3). p. 285-297. Includes references. (NAL Call No.: DNAL SB951.P49).

1126

Interaction of nightshade and dry beans.
Mitich, L.W. Kyser, G.B. Sacramento, Calif. : California Weed Conference Office. Proceedings - California Weed Conference. Paper presented at a conference on "Education and Communication--the Keys to the Future," January 18-21, 1988, Sacramento, California. 1988. (40). p. 216-219. Includes references. (NAL Call No.: DNAL 79.9 C122).

1127

Lambsquarter control in lentils.
Huston, C.H. Callihan, R.H.; Thill, D.C. S.l. : Western Society of Weed Science. Research progress report - Western Society of Weed Science. 1986. p. 157-158. (NAL Call No.: DNAL 79.9 W52R).

1128

Line source herbigation of cinmethylin (SD-95481) for grass control in pinto beans.
WSWPA. Arnold, R.N. Gregory, E.J.; Smeal, D. Reno, Nev. : The Society. Proceedings - Western Society of Weed Science. 1987. v. 40. p. 133-140. (NAL Call No.: DNAL 79.9 W52).

1129

No-till snap bean management system in a white clover sod.
PNWSB. Lindgren, C.B. Ashley, R.A. Beltsville, Md. : The Society. Proceedings of the ... annual meeting - Northeastern Weed Science Society. 1986. v. 40. p. 93-97. Includes references. (NAL Call No.: DNAL 79.9 N814).

1130

Oxyfluorfen: a candidate herbicide for weed control in pigeon peas.
JAUPA. Semidey, N. Almodovar, L. Mayaguez : University of Puerto Rico, Agricultural Experiment Station. The Journal of agriculture of the University of Puerto Rico. July 1987. v. 71 (3). p. 277-285. Includes references. (NAL Call No.: DNAL 8 P832J).

1131

Pest control in commercial pea production.
Stevenson, W.R. Wedberg, J.L.; Doersch, R.E.; Harvey, R.G. Madison, Wis. : The Programs. Publication - Cooperative Extension Programs. University of Wisconsin - Extension. Jan 1985. (A3316). 8 p. ill. (NAL Call No.: DNAL S544.3.W6W53).

1132

Pest control in commercial snap bean production.
Binning, L.K. Wyman, J.A.; Stevenson, W.R. Madison, Wis. : The Programs. Publication - Cooperative Extension Programs. University of Wisconsin - Extension. Jan 1985. (A2329). 8 p. ill. (NAL Call No.: DNAL S544.3.W6W53).

1133

Physiological responses to sethoxydim in tissues of corn (Zea mays) and pea (Pisum sativum).
WEESA6. Hosaka, H. Takagi, M.K. Champaign, Ill. : Weed Science Society of America. Weed science. Sept 1987. v. 35 (5). p. 604-611. ill. Includes references. (NAL Call No.: DNAL 79.8 W41).

1134

Postemergence weed control in pigeon peas with glyphosate shielded treatments.
JAUPA. Semidey, N. Almodovar, L.; Orengo-Santiago, E. Mayaguez : University of Puerto Rico, Agricultural Experiment Station. The Journal of agriculture of the University of Puerto Rico. Oct 1987. v. 71 (4). p. 359-364. Includes references. (NAL Call No.: DNAL 8 P832J).

1135

Potential involvement of alkoxyl and hydroxyl radicals in the peroxidative action of oxyfluorfen.
PCBPB. Upham, B.L. Hatzios, K.K. Duluth, Minn. : Academic Press. Pesticide biochemistry and physiology. June 1987. v. 28 (2). p. 248-256. Includes references. (NAL Call No.: DNAL SB951.P49).

1136

Preplant incorporated herbicide evaluations in pinto beans.
Arnold, R.N. Gregory, E.J.; Smeal, D. S.l. : The Society. Research progress report - Western Society of Weed Science. 1988. p. 219-220. (NAL Call No.: DNAL 79.9 W52R).

1137

Production of snap beans as affected by soil tillage method and row spacing.
JOSHB. Mullins, C.A. Straw, R.A.; Coffey, D.L. Alexandria, Va. : The Society. Conventional tillage (CT), no-tillage (NT), and rotary strip-tillage (RT) methods were combined with row spacings of 0.46 m (28 plants/m2) and 0.92 m (56 plants/m2) in 1985 and 1986 snap bean (Phaseolus vulgaris L.) tests with a split-plot

factorial arrangement of treatments. Yields were lowest with NT and 0.92-m row spacings both years, while plant stands were lowest with NT and RT. Plant lodging was lowest with NT and highest with CT each year. Pod clustering and broken pods following machine harvest were lowest with NT both years, while rotten pods and percentage no. 2 to 4 sieve-size pods were lowest with NT in 1986. Incidence of broken pods was higher with the 0.46-m row spacing than with the 0.92-m row spacing in 1985 and the incidence of rotten pods was greatest with the 0.46-m row spacing in 1986. The 0.46-m row spacing improved yields over the 0.92-m spacing, with minimal difference in pod quality. Weed control was less effective with NT than with CT and RT methods. Journal of the American Society for Horticultural Science. Sept 1988. v. 113 (5). p. 667-669. (NAL Call No.: DNAL 81 S012).

1138

Screening living mulches/cover crops for no-till snap beans.
PNWSB. DeGregorio, R.E. Ashley, R.A. Beltsville, Md. : The Society. Proceedings of the ... annual meeting - Northeastern Weed Science Society. 1986. v. 40. p. 87-91. Includes references. (NAL Call No.: DNAL 79 9 N814).

1139

Selectivity mechanisms of sethoxydim absorption into tissues of corn (Zea mays) and pea (Pisum sativum).
WEESA6. Hosaka, H. Takagi, M.K. Champaign, Ill. : Weed Science Society of America. Weed science. Sept 1987. v. 35 (5). p. 619-622. Includes references. (NAL Call No.: DNAL 79.8 W41).

1140

Sensitivity of fieldbeans (Phaseolus vulgaris) to reduced rates of 2,4-D and dicamba.
WEESA6, Lyon, D.J. Wilson, R.G. Champaign, Ill. : Weed Science Society of America. Weed science. Nov 1986. v. 34 (6). p. 953-956. Includes references. (NAL Call No.: DNAL 79.8 W41).

1141

Sethoxydim metabolism in monocotyledonous and dicotyledonous plants.
WEESA6. Campbell, J.R. Penner, D. Champaign, Ill. : Weed Science Society of America. Weed science. Nov 1985. v. 33 (6). p. 771-773. Includes 12 references. (NAL Call No.: DNAL 79.8 W41).

1142

Soil persistence of chlorsulfuron, dicamba, and picloram as measured in a bioassay study with peas and lentils.
Whitesides, R.E. Swan, D.G. S.l. : Western Society of Weed Science. Research progress report - Western Society of Weed Science. 1986. p. 166. (NAL Call No.: DNAL 79.9 W52R).

1143

Soil residual properties of DPX-A7881 under laboratory conditions.
WEESA6. Beckie, H.J. McKercher, R.B. Champaign, Ill. : Weed Science Society of America. Growth chamber studies were conducted to examine the soil residual properties of DPX-A7881, a new sulfonylurea herbicide. The phytotoxic residue levels in the soil were determined by a lentil radicle bioassay. The duration of activity was prolonged in soil adjusted to pH 7.6 and 8.1 relative to more acidic levels. The rate of breakdown in the soil was enhanced with increased temperature and soil moisture content; a significant temperature by moisture interaction was noted over the duration of the incubation period. The dissipation of DPX-A7881 in soil obeyed first-order kinetics in both studies. An accelerated rate of breakdown in unsterilized versus sterilized soil (pH 7.6) indicated that microbial degradation was an important factor affecting the persistence in alkaline soils. Herbicide residues in the soil caused a reduction in taproot length and number of primary lateral roots of canola seedlings 15 days after planting but there were no other morphological effects observed on the root. The secondary laterals, however, had generally recovered by this time. Weed science. May 1989. v. 37 (3). p. 412-418. Includes references. (NAL Call No.: DNAL 79.8 W41).

1144

Systems approach to weed management in irrigated crops.
WEESA6. Schweizer, E.E. Lybecker, D.W.; Zimdahl, R.L. Champaign, Ill. : Weed Science Society of America. The impact of four weed management systems on weed seed reserves in soil, yearly weed problem, and production of barley, corn, pinto bean, and sugarbeet was assessed where these crops were grown in rotation for 4 consecutive years in four cropping sequences. Weeds were controlled in each crop with only conventional tillage or conventional tillage plus minimum, moderate (system 1), and intensive (system 2) levels of herbicides. Seed of annual weeds from 11 genera were identified, with barynyardgrass and redroot pigweed comprising 66 and 19%, respectively, of the initial 90 million weed seed/ha present in the upper 25 cm of the soil profile. After the fourth cropping year, overall decline in the total number of weed seed in soil was 53% when averaged over four cropping sequences and four weed management systems. Over the 4-yr period, about 10 times more weeds escaped control in system 1 than in

system 2; and within a crop, the fewest number of weeds escaped control annually in barley. System 2 had the highers herbicide use in each cropping sequence, the fewest weeds at harvest, and the smallest adjusted gross return over the 4-yr period in three of four cropping sequences. Weed science. Nov 1988. v. 36 (6). p. 840-845. Includes references. (NAL Call No.: DNAL 79.8 W41).

1145

Tillage for sunflower control and for annual canarygrass and fieldbean production.
AGJOAT. Robinson, R.G. Madison, Wis. : American Society of Agronomy. Agronomy journal. July/Aug 1985. v. 77 (4). p. 612-616. Includes 13 references. (NAL Call No.: DNAL 4 AM34P).

1146

Toxic effect of the roasted and unroasted beans of Cassia occidentalis in goats.
VHTOD. Suliman, H.B. Shommein, A.M. Manhattan, Kan. : American Academy of Veterinary and Comparative Toxicology. Veterinary and human toxicology. Feb 1986. v. 28 (1). p. 6-11. ill. Includes 18 references. (NAL Call No.: DNAL SF601.A47).

1147

Weed control in cole crops, carrots, lettuce, and peas.
Dinkel, D.H. Fairbanks : The Services. Publication - University of Alaska. Cooperative Extension Service. Division of Statewide Services. Mar 1985. (A-00140, rev.). 6 p. (NAL Call No.: DNAL 275.29 AL13P).

1148

Weed control in dry beans.
BAESD. Whitson, T.D. Miller, S.D. Laramie, Wyo. : The Service. Bulletin - Wyoming University, Cooperative Extension Service. In subseries: Wyoming weed control series. Apr 1989. (442.6). 5 p. (NAL Call No.: DNAL 275.29 W99B).

1149

Weed control in field beans.
Parker, R. Bozeman, Mont. : The Service. Montguide MT : Human resource development - Montana State University, Cooperative Extension Service. June 1988. (0765,rev.). 4 p. (NAL Call No.: DNAL S544.3.M9M652).

1150

Weed control in green peas.
WUEXA. Howard, S.W. Peabody, D.V. Pullman, Wash. : The Service. Extension bulletin - Washington State University, Cooperative Extension Service. Mar 1989. (1061,rev.). 6 p. (NAL Call No.: DNAL 275.29 W27P).

1151

Weed control in lima beans.
PNWSB. Kee, E. Beltsville, Md. : The Society. Proceedings of the ... annual meeting - Northeastern Weed Science Society. 1987. v. 41. p. 115. (NAL Call No.: DNAL 79.9 N814).

1152

Weed control in narrow row snap bean production.
Tyson, R.V. Kostewicz, S.R. s.l. : The Society. Proceedings of the ... annual meeting of the Florida State Horticulture Society. 1986 (pub. 1987). v. 99. p. 358-362. Includes references. (NAL Call No.: DNAL SB319.2.F6F56).

1153

Weed control in pinto beans with preplant incorporated or complementary preplant incorporated/preemergence herbicides.
Miller, S.D. Fornstrom, K.J. S.l. : The Society. Research progress report - Western Society of Weed Science. 1988. p. 225-226. (NAL Call No.: DNAL 79.9 W52R).

1154

Weed control in red kidney beans with preemergence and complementary preemergence/postemergence treatments.
Miller, S.D. Fornstrom, K.J. S.l. : The Society. Research progress report - Western Society of Weed Science. 1988. p. 229-230. (NAL Call No.: DNAL 79.9 W52R).

1155

Weed control in spring peas.
Prather, T.S. Callihan, R.H.; Thill, D.C. S.l. : The Society. Research progress report - Western Society of Weed Science. 1988. p. 264-266. (NAL Call No.: DNAL 79.9 W52R).

1156

Weed control with preemergence and complementary preemergence/postemergence herbicides in pinto beans.
Miller, S.D. Fornstrom, K.J. S.l. : The Society. Research progress report - Western Society of Weed Science. 1988. p. 227-228. (NAL Call No.: DNAL 79.9 W52R).

1157

Wild oat control in lentils.
Callihan, R.H. Huston, C.H.; Thill, D.C. S.l. : Western Society of Weed Science. Research progress report - Western Society of Weed Science. 1986. p. 159-160. (NAL Call No.: DNAL 79.9 W52R).

1158

Yield reductions in field peas and lentils resulting from volunteer crop competition.
WSWPA. Hornford, R.G. Drew, B.N. Reno : The Society. Proceedings - Western Society of Weed Science. 1985. v. 38. p. 122-125. (NAL Call No.: DNAL 79.9 W52).

1159

$10 weed control in no-till beans.
Brusko, M. Emmaus, Pa. : Regenerative Agriculture Association. The New farm. Feb 1987. v. 9 (2). p. 10-11. ill. (NAL Call No.: DNAL S1.N32).

1160

Absorption, translocation, and metabolism of 14C-thuringiensin (beta-exotoxin) in snapbeans.
FETMA. Mersie, W. Singh, M. Gainesville, Fla. : Florida Entomological Society. Florida entomologist. June 1988. v. 71 (2). p. 105-111. Includes references. (NAL Call No.: DNAL 420 F662).

1161

Accumulation of polychlorobiphenyl congeners and p,p-DDE at environmental concentrations by corn and beans.
EESAD. Shane, L.A. Bush, B. Duluth, Minn. Academic Press. Ecotoxicology and environmental safety. Feb 1989. v. 17 (1). p. 38-46. Includes references. (NAL Call No.: DNAL QH545.A1E29).

1162

Biomass synthesis and nitrite reductase activity as indicators of phytotoxicity of some herbicides.
PNWSB. Zbiec, I.I. Devlin, R.M.; Nowicka, S.E. College Park, Md. : The Society. Proceedings of the annual meeting - Northeastern Weed Science Society. Meeting held on January 4-6, 1989, Baltimore, Maryland. 1989. v. 43. p. 49-52. Includes references. (NAL Call No.: DNAL 79.9 N814).

1163

Butachlor influence on selected metabolic processes of plant cells and tissues.
JPGRDI. Chang, S.S. Ashton, F.M.; Bayer, D.E. New York, N.Y. : Springer. Journal of plant growth regulation. 1985. v. 4 (1). p. 1-9. Includes references. (NAL Call No.: DNAL QK745.J6).

1164

Chlorinated pesticides and plant foliage: translocation experiments.
BECTA. Bacci, E. Gaggi, C. New York, N.Y. : Springer-Verlag. Bulletin of environmental contamination and toxicology. Dec 1986. v. 37 (6). p. 850-857. Includes references. (NAL Call No.: DNAL RA1270.P35A1).

1165

Chlorsulfuron persistence and response of legumes in an alkaline soil.
JPFCD2. Moyer, J.R. Bergen, P.; Kozub, G.C. New York, N.Y. : Marcel Dekker. Journal of environmental science and health : Part B :- Pesticides, food contaminants, and agricultural wastes. 1989. v. 24 (1). p. 37-56. Includes references. (NAL Call No.: DNAL TD172.J61).

1166

Colorimetric determination of propoxur residues in vegetables and water.
BECTA. Appaiah, K.M. Sreenivasa, M.A.; Kapur, O.P. New York, N.Y. : Springer-Verlag. Bulletin of environmental contamination and toxicology. Sept 1985. v. 35 (3). p. 296-300. Includes references. (NAL Call No.: DNAL RA1270.P35A1).

1167

The comparative cell cycle and metabolic effects of the herbicide napropamide on root tip meristems.
PCBPB. DiTomaso, J.M. Rost, T.L.; Ashton, F.M. Duluth, Minn. : Academic Press. Pesticide biochemistry and physiology. June 1988. v. 31 (2). p. 166-174. Includes references. (NAL Call No.: DNAL SB951.P49).

1168

Comparative persistence and mobility of pyridine and phenoxy herbicides in soil.
WETEE9. Jotcham, J.R. Smith, D.W.; Stephenson, G.R. Champaign, Ill. : The Society. Weed technology : a journal of the Weed Science Society of America. Jan/Mar 1989. v. 3 (1). p. 155-161. Includes references. (NAL Call No.: DNAL SB610.W39).

1169

Cyanazine residues on fieldbeans (Phaseolus vulgaris) as a replant crop.
WETEE9. Wilson, R.G. Champaign, Ill. : The Society. Weed technology : a journal of the Weed Science Society of America. Jan 1988. v. 2 (1). p. 28-30. Includes references. (NAL Call No.: DNAL SB610.W39).

1170

Cyclohexanedione herbicides are selective and potent inhibitors of acetyl-CoA carboxylase from grasses.
PLPHA. Rendina, A.R. Felts, J.M. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Apr 1988. v. 86 (4). p. 983-986. Includes references. (NAL Call No.: DNAL 450 P692).

1171

Dissipation of isomalathion on solid pesticide carriers, container surfaces, and leaves and some degradation products of isomalation on carriers.
JAFCAU. Rengasamy, S. Parmar, B.S. Washington, D.C. : American Chemical Society. Journal of agricultural and food chemistry. Mar/Apr 1989. 37 (2). p. 430-433. Includes references. (NAL Call No.: DNAL 381 J8223).

1172

Effect of diuron on the process of photophosphorylation in chloroplasts and protein biosynthesis in seeds of pea.
SOPPAA. Tatarintsev, N.P. Lebedeva, A.I.; Makarov, A.D. New York, N.Y. : Consultants Bureau. Soviet plant physiology. Translated from: Fiziologiia rastenii, v. 33 (3), May-June 1986, p. 484-489. (450 F58). May/June 1986. v. 33 (3,pt.1). p. 372-376. Includes references. (NAL Call No.: DNAL 450 F58AE).

1173

The effect of DPX-F6025 on plant growth, pigment synthesis, and biomass synthesis.
PNWSB. Devlin, R.M. Koszanski, Z.K. Beltsville, Md. : The Society. Proceedings of the ... annual meeting - Northeastern Weed Science Society. 1986. v. 40. p. 115-119. Includes references. (NAL Call No.: DNAL 79.9 N814).

1174

Effect of foliar applied simazine and ammonium nitrate on the elemental content of cowpea seeds.
JFDAZ. Meredith, F.I. Langdale, G.W.; Searcy, G.K.; Hollander, S.A. Chicago, Ill. : Institute of Food Technologists. Journal of food science. Jan/Feb 1985. v. 50 (1). p. 93-95, 105. Includes references. (NAL Call No.: DNAL 389.8 F7322).

1175

Effect of glyphosate on indole-3-acetic acid metabolism in tolerant and susceptible plants.
JPGRDI. Lee, T.T. Dumas, T. New York, N.Y. : Springer. Journal of plant growth regulation. 1985. v. 4 (1). p. 29-39. ill. Includes references. (NAL Call No.: DNAL QK745.J6).

1176

The effect of long term use of herbicides on an orchard soil.
Lourens, A.F. Lange, A.H. S.l. : Western Society of Weed Science. Research progress report - Western Society of Weed Science. 1987. p. 107-108. (NAL Call No.: DNAL 79.9 W52R).

1177

Effects of dimethazone (FMC 57020) on chloroplast development. I. Ultrastructural effects in cowpea (Vigna unguiculata L.) primary leaves.
PCBPB. Duke, S.O. Paul, R.N. Duluth, Minn. : Academic Press. Pesticide biochemistry and physiology. Feb 1986. v. 25 (1). p. 1-10. ill. Includes references. (NAL Call No.: DNAL SB951.P49).

1178

Effects of dimethazone (FMC 57020) on chloroplast development. II. Pigment synthesis and photosynthetic function in cowpea (Vigna unguiculata L.) primary leaves.
PCBPB. Duke, S.O. Kenyon, W.H. Duluth, Minn. : Academic Press. Pesticide biochemistry and physiology. Feb 1986. v. 25 (1). p. 11-18. Includes references. (NAL Call No.: DNAL SB951.P49).

1179

Effects of inhibitors and herbicides on the membrane potential of mung bean mitochondria.
PCBPB. Moreland, D.E. Novitzky, W.P. Duluth, Minn. : Academic Press. Pesticide biochemistry and physiology. July 1988. v. 31 (3). p. 247-260. Includes references. (NAL Call No.: DNAL SB951.P49).

1180

Efficacy and lentil tolerance of pyridate and pyridate / methazole.
Prather, T.S. Callihan, R.H.; Lopez, R.L.; Thill, D.C. S.l. : The Society. Research progress report - Western Society of Weed Science. 1988. p. 263. (NAL Call No.: DNAL 79.9 W52R).

1181

Efficacy, phytotoxicity, soil residual of imazathepyr on peas and lima beans.
PNWSB. Kee, E. Rider, L. College Park, Md. : The Society. Proceedings of the annual meeting - Northeastern Weed Science Society. Meeting held January 6, 7 & 8, 1988 in Hartford, Connecticut. 1988. v. 42. p. 191-198. Includes references. (NAL Call No.: DNAL 79.9 N814).

1182

The generation of singlet oxygen (1O2) by the nitrodiphenyl ether herbicide oxyfluorfen is independent of photosynthesis.
PLPHA. Haworth, P. Hess, F.D. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Mar 1988. v. 86 (3). p. 672-676. Includes references. (NAL Call No.: DNAL 450 P692).

1183

Herbicidal effects of fomesafen.
PNWSB. Devlin, R.M. Koszanski, Z.K. College Park, Md. : The Society. Proceedings of the annual meeting - Northeastern Weed Science Society. Meeting held January 6, 7 & 8, 1988 in Hartford, Connecticut. 1988. v. 42. p. 67-72. Includes references. (NAL Call No.: DNAL 79.9 N814).

1184

Herbicide residues from winter wheat plots: effect of tillage and crop management.
JEVQAA. Brown, D.F. McCool, D.K.; Papendick, R.L.; McDonough, L.M. Madison, Wis. : American Society of Agronomy. Journal of environmental quality. Oct/Dec 1985. v. 14 (4). p. 521-532. Includes references. (NAL Call No.: DNAL QH540.J6).

1185

Inhibition of corn acetyl-CoA carboxylase by cyclohexanedione and aryloxyphenoxypropionate herbicides.
PCBPB. Burton, J.D. Gronwald, J.W.; Somers, D.A.; Gengenbach, B.G.; Wyse, D.L. Duluth, Minn. : Academic Press. Pesticide biochemistry and physiology. May 1989. v. 34 (1). p. 76-85. Includes references. (NAL Call No.: DNAL SB951.P49).

1186

Inhibition of fatty acid biosynthesis in isolated bean and maize chloroplasts by herbicidal phenoxy-phenoxypropionic acid derivatives and structurally related compounds.
PCBPB. Hoppe, H.H. Zacher, H. Duluth, Minn. : Academic Press. Pesticide biochemistry and physiology. Dec 1985. v. 24 (3). p. 298-305. Includes references. (NAL Call No.: DNAL SB951.P49).

1187

Insecticidal activity and lectin homology of arcelin seed protein.
SCIEA. Osborn, T.C. Alexander, D.C.; Sun, S.S.M.; Cardona, C.; Bliss, F.A. Washington, D.C. : American Association for the Advancement of Science. Science. Apr 8, 1988. v. 240 (4849). p. 207-210. Includes references. (NAL Call No.: DNAL 470 SCI2).

1188

Insecticide evaluation on snap bean, 1984-1988 /Paul McLeod.
McLeod, Paul Jean. Fayetteville, Ark. : Arkansas Agricultural Experiment Station, 1989. "August 1989."-Cover. 5 p. ; 23 cm. (NAL Call No.: DNAL S541.5 .A8R47 no.386).

1189

Mechanisms of differential inhibitory effects of sodium sulfanilate on folic acid biosynthesis in plants.
PCBPB. Lin, K.H. Zhang, L.H. Duluth, Minn. : Academic Press. Pesticide biochemistry and physiology. Sept 1988. v. 32 (1). p. 17-24. Includes references. (NAL Call No.: DNAL SB951.P49).

1190

Mechanisms of selective action of sodium sulfanilate on plants.
PCBPB. Zhang, L.H. Lin, K.H. Duluth, Minn. Academic Press. Pesticide biochemistry and physiology. Sept 1988. v. 32 (1). p. 11-16. Includes references. (NAL Call No.: DNAL SB951.P49).

1191

Metabolism of N-hydroxymethyl dimethoate and N-desmethyl dimethoate in bean plants.
PCBPB. Garner, W.Y. Menzer, R.E. Duluth, Minn. : Academic Press. Pesticide biochemistry and physiology. Apr 1987. v. 25 (2). p. 218-232. ill. Includes references. (NAL Call No.: DNAL SB951.P49).

1192

Metribuzin tolerance in chickpeas.
Prather, T.S. Callihan, R.H.; Thill, D.C. S.l. : Western Society of Weed Science. Research progress report - Western Society of Weed Science. 1987. p. 228. (NAL Call No.: DNAL 79.9 W52R).

1193

Metribuzin tolerance within the genus Vigna.
WETEE9. Harrison, H.F. Jr. Champaign, Ill. : The Society. Weed technology : a journal of the Weed Science Society of America. Jan 1988. v. 2 (1). p. 59-63. Includes references. (NAL Call No.: DNAL SB610.W39).

1194

Napropamide stress-induced polyamine accumulation in pea root tips.
DiTomaso, J.M. Rost, T.L.; Ashton, F.M. Sacramento, Calif. : California Weed Conference Office. Proceedings - California Weed Conference. 1987. (39th). p. 30. (NAL Call No.: DNAL 79.9 C122).

1195

NF-10 bioactivators enhance photosynthesis, plant growth, yield and quality in commercial crops.
PPGGD. Tenzer, A.I. Lake Alfred, Fla. : The Society. Proceedings annual meeting - Plant Growth Regulator Society of America. 1987. (14th). p. 316-325. Includes references. (NAL Call No.: DNAL SB128.P5).

1196

Oxyfluorfen: a candidate herbicide for weed control in pigeon peas.
JAUPA. Semidey, N. Almodovar, L. Mayaguez : University of Puerto Rico, Agricultural Experiment Station. The Journal of agriculture of the University of Puerto Rico. July 1987. v. 71 (3). p. 277-285. Includes references. (NAL Call No.: DNAL 8 P832J).

1197

R-25788 effects on chlorsulfuron injury and acetohydroxyacid synthase activity.
WEESA6. Rubin, B. Casida, J.E. Champaign, Ill. : Weed Science Society of America. Weed science. July 1985. v. 33 (4). p. 462-468. Includes 24 references. (NAL Call No.: DNAL 79.8 W41).

1198

Residual effect of metsulfuron applied during the fallow year on barley and lentils.
Mashhadi, H.R. Evans, J.O. S.l. : The Society. Research progress report - Western Society of Weed Science. 1988. p. 258-259. (NAL Call No.: DNAL 79.9 W52R).

1199

Some physiological effects of AC-252,214 on several plant growth systems.
PNWSB. Devlin, R.M. Koszanski, Z.K. Beltsville, Md. : The Society. Proceedings of the ... annual meeting - Northeastern Weed Science Society. 1986. v. 40. p. 99-103. Includes references. (NAL Call No.: DNAL 79.9 N814).

1200

Strategies for chemical control of snap bean rust in Florida and their compatibility with Canadian residue tolerances.
PLDRA. Pohronezny, K. Francis, J.; Fong, W.G. St. Paul, Minn. : American Phytopathological Society. Plant disease. July 1987. v. 71 (7). p. 639-642. Includes references. (NAL Call No.: DNAL 1.9 P69P).

1201

Tridiphane 2-(3,5-dichlorophenyl)-2-(2,2,2-trichloroethy-l)oxirane an atrazine synergist: enzymatic conversion to a potent glutathione S-transferase inhibitor.
PCBPB. Lamoureux, G.L. Rusness, D.G. Duluth, Minn. : Academic Press. Pesticide biochemistry and physiology. Dec 1986. v. 26 (3). p. 323-342. Includes 40 references. (NAL Call No.: DNAL SB951.P49).

1202

Use of Alcaligenes eutrophus as a source of genes for 2,4-D resistance in plants.
WEESA6. Perkins, E.J. Stiff, C.M.; Lurquin, P.F. Champaign, Ill. : Weed Science Society of America. Weed science. Paper presented at the "Symposium on Genetic Engineering for Herbicide Resistance," Feb. 1985. 1987. v. 35 (Suppl.1). p. 12-18. Includes references. (NAL Call No.: DNAL 79.8 W41).

1203

Weed control in spring peas.
Prather, T.S. Callihan, R.H.; Thill, D.C. S.l. : The Society. Research progress report - Western Society of Weed Science. 1988. p. 264-266. (NAL Call No.: DNAL 79.9 W52R).

1204

Characterization of rhizobia from ineffective alfalfa nodules: ability to nodulate bean plants Phaseolus vulgaris (L.) Savi. .
APMBA. Eardly, B.D. Hannaway, D.B.; Bottomley, P.J. Washington, D.C. : American Society for Microbiology. Applied and environmental microbiology. Dec 1985. v. 50 (6). p. 1422-1427. Includes 40 references. (NAL Call No.: DNAL 448.3 AP5).

1205

The effect of Pseudomonas putida colonization on root surface peroxidase.
PLPHA. Albert, F. Anderson, A.J. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Oct 1987. v. 85 (2). p. 537-541. ill. Includes references. (NAL Call No.: DNAL 450 P692).

1206

Effect of soil environmental factors on rhizobia.
Roughley, R.J. Boulder, Colo. : Westview Press, 1985. World Soybean Research Conference III : proceedings / edited by Richard Shibles. Literature review. p. 903-910. Includes references. (NAL Call No.: DNAL SB205.S7W6 1984).

1207

Effects of soil fertility on growth, tuber yield, nodulation and nitrogen fixation of yam bean (Pachyrhizus erosus (L.) Urban) grown on a Typic Eutrustox.
JPNUDS. Lynd, J.Q. Purcino, A.A.C. New York, N.Y. : Marcel Dekker. Journal of plant nutrition. Apr 1987. v. 10 (5). p. 485-500. ill. Includes references. (NAL Call No.: DNAL QK867.J67).

1208

Host legume control of Rhizobium function.
Phillips, D.a. Bedmar, E.J.; Qualset, C.O.; Teuber, L.R. New York : Elsevier, c1985. Nitrogen fixation and CO2 metabolism : proceedings, Fourteenth Steenbock Symposium, 17-22 June 1984 at the University of Wisconsin--Madison, Madison, Wisconsin, U.S.A. / editors, Paul W. Ludden and Jo. Literature review. p. 203-212. Includes 40 references. (NAL Call No.: DNAL QH345.H37 1984).

1209

Influence of ethylene produced by soil microorganisms on etiolated pea seedlings.
APMBA. Arshad, M. Frankenberger, W.T. Jr. Washington, D.C. : American Society for Microbiology. There is indirect evidence that soil microorganisms producing ethylene (C2H4) can influence plant growth and development, but unequivocal proof is lacking in the literature. A laboratory study was conducted to demonstrate the validity of this speculation. Four experiments were carried out to observe the characteristic "triple" response of etiolated pea seedlings to C2H4 microbially derived from L-methionine as a substrate in the presence or absence of Ag(I), a potent inhibitor of C2H4 action. In two experiments, the combination of L-methionine and Acremonium falciforme (as an inoculum) was used, while in another study the indigenous soil microflora was responsible for C2H4 production. A standardized experiment was conducted with C2H4 gas to compare the contribution of the microflora to plant growth. In all cases, etiolated pea seedlings exhibited the classical triple response, which includes reduction in elongation, swelling of the hypocotyl, and a change in the direction of growth (horizontal). The presence of Ag(I) afforded protection to the pea seedlings against the microbially derived C2H4. This study demonstrates that microbially produced C2H4 in soil can influence plant growth. Applied and environmental microbiology. Nov 1988. v. 54 (11). p. 2728-2732. ill. Includes references. (NAL Call No.: DNAL 448.3 AP5).

1210

Influence of the Bradyrhizobium japonicum hydrogenase on the growth of Glycine and Vigna species.
APMBA. Drevon, J.J. Kalia, V.C.; Heckmann, M.O.; Salsac, L. Washington, D.C. : American Society for Microbiology. Applied and environmental microbiology. Mar 1987. v. 53 (3). p. 610-612. Includes references. (NAL Call No.: DNAL 448.3 AP5).

1211

Nitrate inhibition of legume nodule growth and activity.
PLPHA. Streeter, J.G. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Feb 1985. v. 77 (2). p. 321-324. ill. Includes 17 references. (NAL Call No.: DNAL 450 P692).

1212

Partitioning of nitrogen-15-labeled biologically fixed nitrogen and nitrogen-15-labeled nitrate in cowpea during pod development.
AGJOAT. Douglas, L.A. Weaver, R.W. Madison, Wis. : American Society of Agronomy. Agronomy journal. May/June 1986. v. 78 (3). p. 499-502.

Includes references. (NAL Call No.: DNAL 4 AM34P).

1213

Possible involvement of phage-like structures in antagonism of cowpea rhizobia by Rhizobium trifolii.
APMBA. Joseph, M.V. Desai, J.D.; Desai, A.J. Washington, D.C. : American Society for Microbiology. Applied and environmental microbiology. Feb 1985. v. 49 (2). p. 459-461. ill. Includes 18 references. (NAL Call No.: DNAL 448.3 AP5).

1214

Soil residual properties of DPX-A7881 under laboratory conditions.
WEESA6. Beckie, H.J. McKercher, R.B. Champaign, Ill. : Weed Science Society of America. Growth chamber studies were conducted to examine the soil residual properties of DPX-A7881, a new sulfonylurea herbicide. The phytotoxic residue levels in the soil were determined by a lentil radicle bioassay. The duration of activity was prolonged in soil adjusted to pH 7.6 and 8.1 relative to more acidic levels. The rate of breakdown in the soil was enhanced with increased temperature and soil moisture content; a significant temperature by moisture interaction was noted over the duration of the incubation period. The dissipation of DPX-A7881 in soil obeyed first-order kinetics in both studies. An accelerated rate of breakdown in unsterilized versus sterilized soil (pH 7.6) indicated that microbial degradation was an important factor affecting the persistence in alkaline soils. Herbicide residues in the soil caused a reduction in taproot length and number of primary lateral roots of canola seedlings 15 days after planting but there were no other morphological effects observed on the root. The secondary laterals, however, had generally recovered by this time. Weed science. May 1989. v. 37 (3). p. 412-418. Includes references. (NAL Call No.: DNAL 79.8 W41).

1215

The use of benomyl to control infection by vesicular-arbuscular mycorrhizal fungi.
NEPHA. Fitter, A.H. Nichols, R. New York, N.Y. : Cambridge University Press. The New phytologist. Oct 1988. v. 110 (2). p. 201-206. Includes references. (NAL Call No.: DNAL 450 N42).

1216

Chlorsulfuron persistence and response of legumes in an alkaline soil.
JPFCD2. Moyer, J.R. Bergen, P.; Kozub, G.C. New York, N.Y. : Marcel Dekker. Journal of environmental science and health : Part B : Pesticides, food contaminants, and agricultural wastes. 1989. v. 24 (1). p. 37-56. Includes references. (NAL Call No.: DNAL TD172.J61).

1217

Common ragweed interference in snap beans at various soil potassium levels.
AAREEZ. Evanylo, G.K. Zehnder, G.W. New York, N.Y. : Springer. Effects of interference of common ragweed (Ambrosia artemisiifolia L.) and herbicide control (Trifluralin) at various soil K levels on yield and nutrient uptake by snap beans (Phaseolus vulgaris L. "Provider") were investigated in field studies. Trifluralin produced no significant effects upon snap bean dry matter production, fresh market pod yields, or pod nutrient accumulation. Competition from common ragweed from seeding to flowering (30 days) and for the full season (50 days) decreased snap bean pod yields by 30 and75%, respectively. Yield reduction in the presence of common ragweed up to flowering was related to decreased leaf dry matter production. Snap bean pod yields and nutrient accumulation were increased with K fertilization when only full-season weed competition occurred. Potassium fertilizer adjustments based on subsoil K levels may be beneficially applied to snap beans. Applied agricultural research. Spring 1989. v. 4 (2). p. 101-105. Includes references. (NAL Call No.: DNAL S539.5.A77).

1218

The effect of long term use of herbicides on an orchard soil.
Lourens, A.F. Lange, A.H. S.l. : Western Society of Weed Science. Research progress report - Western Society of Weed Science. 1987. p. 107-108. (NAL Call No.: DNAL 79.9 W52R).

1219

Effect of paraplowing on wheat and fresh pea yields.
Wilkins, D.E. Rasmussen, P.E.; Kraft, J.M. St. Joseph, Mich. : The Society. American Society of Agricultural Engineers (Microfiche collection). Paper presented at the 1986 Winter Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St. Joseph, Michigan 49085. Telephone the Order Dept. at (616) 429-0300 for information and prices. 1986. (fiche no. 86-1516). 13 p. Includes references. (NAL Call No.: DNAL FICHE S-72).

1220

Effect of soil pH on crop yield in northern Idaho.
AGJOAT. Mahler, R.L. McDole, R.E. Madison, Wis. : American Society of Agronomy. Agronomy journal. July/Aug 1987. v. 79 (4). p. 751-755. Includes references. (NAL Call No.: DNAL 4 AM34P).

1221

The effect of soil pH on wheat and lentils grown on an agriculturally acidified northern Idaho soil under greenhouse conditions.
CSOSA2. Mohebbi, S. Mahler, R.L. New York, N.Y. : Marcel Dekker. Communications in soil science and plant analysis. Feb 1989. v. 71 (3/4). p. 359-381. Includes references. (NAL Call No.: DNAL S590.C63).

1222

The effects of soil compaction and organic matter on the growth of bush beans.
TAAEA. Ohu, J.O. Raghavan, G.S.V.; McKyes, E.; Stewart, K.A.; Fanous, M.A. St. Joseph, Mich. : The Society. Transactions of the ASAE - American Society of Agricultural Engineers. July/Aug 1985. v. 28 (4). p. 1056-1061. Includes references. (NAL Call No.: DNAL 290.9 AM32T).

1223

Long-term tillage and crop rotation effects on bulk density and soil impedance in northern Idaho.
SSSJD4. Hammel, J.E. Madison, Wis. : The Society. Conservation tillage management for winter wheat (Triticum aestivum L.) production in northern Idaho may increase bulk density (Pb) and soil impedance (SI) of surface layers and limit crop growth, particularly when combined with spring cropping practices which require cultural or tillage operations during moist soil conditions. Bulk density and SI were measured in a long-term tillage-crop rotation experiment after 10 yr of continuous management to determine if differences resulting from tillage or cropping practices existed. Soils of the experimental site were two similar series, Palouse (fine-silty, mixed, mesic Pachic Ultic Haploxeroll) and Naff (fine-silty, mixed, mesic Ultic Argixeroll) silt loams. Tillage treatments included conventional (CON, moldboard plow), minimum (MIN, chisel), and no-tillage (NOT). Crop rotations were a 2-yr winter wheat-spring pea (Pisum sativum L.) rotation and a 3 yr winter-spring barley (Hordeum vulgare L.)-spring pea rotation. Bulk density was determined on intact cores using gamma attenuation. Soil impedance was measured with a constant-rate penetrometer. Tillage had a significant ($P < 0.05$) effect on pb, but not SI. Crop rotation did not significantly influence either soil property. The main effect of depth and a tillage X depth interaction,

however, produced significant ($P < 0.01$) differences on pb, and SI. Both MIN and NOT had SI values exceeding 1.5 MPa at a depth of 0.05 to 0.15 m, which were 0.5 to 1.0 MPa greater than CON. Higher SI values under reduced tillage while not preventing root growth may, when combined with cool, wet soil conditions during the spring, limit root function and decrease crop growth potential. Soil Science Society of America journal. Sept/Oct 1989. v. 53 (5). p. 1515-1519. Includes references. (NAL Call No.: DNAL 56.9 SO3).

1224

Rhizosphere acidification by iron deficient bean plants: the role of trace amounts of divalent metal ions. A study on roots of intact plants with the use of 11C- and 31P-NMR.
PLPHA. Bienfait, H.F. Lubberding, H.J.; Heutink, P.; Lindner, L.; Visser, J.; Kaptein, R.; Dijkstra, K. Rockville, Md. : American Society of Plant Physiologists. Rhizosphere acidification by Fe-deficient bean (Phaseolus vulgaris L.) plants was induced by trace amounts of divalent metal ions (Zn, Mn). The induction of this Fe-efficiency reaction was studied by $^{14}CO_2$ and $^{11}CO_2$ fixation experiments, and with 31P-NMR on roots of whole plants. The starting and ending of an acidification cycle was closely coupled to parallel changes in CO_2 fixation, within the maximal resolution capacity of 20 min. 31P-NMR experiments on intact root systems showed one peak which was ascribed to vacuolar free phosphate. At the onset of proton extrusion this peak shifted, indicating increase of pH in the cells. Proton extrusion was inhibited, with a lag period of 2 hours, by the protein synthesis inhibitors cycloheximide and hygromycin. It is assumed that Zn and Mn induce proton extrusion in Fe-deficient bean roots by activating the synthesis of a short-living polypeptide; the NMR data suggest a role for this peptide in the functioning of a proton pumping ATPase in the plasma membrane. Plant physiology. May 1989. v. 90 (1). p. 359-364. Includes references. (NAL Call No.: DNAL 450 P692).

1225

Seedling test for the quantitative measurement of root tolerances to compacted soil.
CRPSAY. Asady, G.H. Smucker, A.J.M.; Adams, M.W. Madison, Wis. : Crop Science Society of America. Crop science. Sept/Oct 1985. v. 25 (5). p. 802-806. Includes references. (NAL Call No.: DNAL 64.8 C883).

1226

Soil compaction losses in pinto beans.
Croissant, R.L. Schwartz, H.F.; Ayers, P.D. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1988. v. 31. p. 58-59. Includes references. (NAL Call No.: DNAL SB327.A1B5).

1227

Soil compaction reduces nodulation, nodule efficiency, and growth of soybean and white bean.
HJHSA. Tu, J.C. Buttery, B.R. Alexandria, Va. : American Society for Horticultural Science. HortScience. Aug 1988. v. 23 (4). p. 722-724. Includes references. (NAL Call No.: DNAL SB1.H6).

1228

Yield and plant nutrient content of vegetables trickle-irrigated with municipal wastewater.
HJHSA. Neilsen, G.H. Stevenson, D.S.; Fitzpatrick, J.J.; Brownlee, C.H. Alexandria, Va. : American Society for Horticultural Science. HortScience. Apr 1989. v. 24 (2). p. 249-252. Includes references. (NAL Call No.: DNAL SB1.H6).

1229

Yield response of watermelon, tomato and pigeon pea to land preparation techniques in southern Puerto Rico.
JAUPA. Lugo-Mercado, H.M. Badillo-Feliciano, J.; Ortiz-Alvarado, F.H. Mayaguez : University of Puerto Rico, Agricultural Experiment Station. The Journal of agriculture of the University of Puerto Rico. Apr 1987. v. 71 (2). p. 203-208. Includes references. (NAL Call No.: DNAL 8 P832J).

1230

Assessing risk of solid waste compost.
BCYCDK. Dyer, J.M. Razvi, A.S. Emmaus, Pa. : J.G. Press. BioCycle. Mar 1987. v. 28 (3). p. 31-36. Includes references. (NAL Call No.: DNAL 57.8 C734).

1231

Commercial vegetable production: lima beans.
McLaurin, W.J. Barber, J.M.; Colditz, P. Athens, Ga. : The Service. Circular - Cooperative Extension Service, University of Georgia. Oct 1985. (716,rev.). 4 p. (NAL Call No.: DNAL 275.29 G29C).

1232

The effect of added nitrogen on biomass and the incidence of white mold from two on-farm research trials. 1988.
Nuland, D. Schild, J.; Anderson, F. Fort Collins, Colo : Howard F. Schwartz, Colorado State University. Annual report of the Bean Improvement Cooperative. 1989. v. 32. p. 109-110. (NAL Call No.: DNAL SB327.A1B5).

1233

Effect of foliar fertilization by ammonium sulphate, sodium nitrate, and ammonium nitrate on the morphology and metabolism of lentil (Lens esculentus).
PYTLA. Kord, M.A. Corvallis, Or. : Harold N. and Alma L. Moldenke. Phytologia. June 1987. v. 63 (2). p. 91-101. Includes references. (NAL Call No.: DNAL 450 P563).

1234

Effect of nitrate on the organic acid and amino acid composition of legume nodules.
PLPHA. Streeter, J.G. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Nov 1987. v. 85 (3). p. 774-779. Includes references. (NAL Call No.: DNAL 450 P692).

1235

Effect of peat: vermiculite mixes containing Trichoderma harzianum on increased growth response of radish.
JOSHB. Paulitz, T. Windham, M.; Baker, R. Alexandria, Va. : The Society. Journal of the American Society for Horticultural Science. Sept 1986. v. 111 (5). p. 810-814. Includes references. (NAL Call No.: DNAL 81 SO12).

1236

Effect of VA mycorrhizae and bark ash on the growth and N2-fixation of two legumes.
Niemi, M. Eklund, M. Philadelphia, Pa. : Balaban Publishers. Symbiosis. Paper presented at the "Symposium on Nitrogen Fixation and Symbiotic Systems," February 28-March 1, 1988, Jerusalem. 1988 v. 6 (1/2). p. 167-180. Includes references. (NAL Call No.: DNAL QH548.S9).

1237

Effects of fertilization and in-row spacing on performance of two BBL type cultivars.
Mullins, C.A. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1988. v. 31. p. 166. (NAL Call No.: DNAL SB327.A1B5).

1238

Effects of nitrogen fertilization on production of mechanically harvested snap beans.
HJHSA. Mullins, C.A. Alexandria, Va. : American Society for Horticultural Science. HortScience. Feb 1987. v. 22 (1). p. 34-36. Includes references. (NAL Call No.: DNAL SB1.H6).

1239

Effects of soil fertility on growth, tuber yield, nodulation and nitrogen fixation of yam bean (Pachyrhizus erosus (L.) Urban) grown on a Typic Eutrustox.
JPNUDS. Lynd, J.Q. Purcino, A.A.C. New York, N.Y. : Marcel Dekker. Journal of plant nutrition. Apr 1987. v. 10 (5). p. 485-500. ill. Includes references. (NAL Call No.: DNAL QK867.J67).

1240

The effects of winter cover crops on the production of cotton grown on a Norwood very fine sandy loam.
Millhollon, E.P. Beck, A.W. Bossier City, La. : The Station. Annual research report - Red River Research Station. Includes statistical data. 1987. p. 153-162. (NAL Call No.: DNAL 100 L9333).

1241

Evaluation of salt tolerance in cowpea and tobacco: effects of NaCl on growth, relative turgidity and photosynthesis.
JPNUDS. Kannan, S. Ramani, S. New York, N.Y. : Marcel Dekker. Journal of plant nutrition. Apr 1988. v. 11 (4). p. 435-448. ill. Includes references. (NAL Call No.: DNAL QK867.J67).

1242

Evaluation of the green manure potential of Austrian winter peas in northern Idaho.
AGJOAT. Mahler, R.L. Auld, D.L. Madison, Wis. American Society of Agronomy. The objective of this field study was to determine the effect of Austrian winter peas Pisum sativum spp. arvense (L.) Poir used as either a green manure (GMP) or seed pea (SP) crop on soil N levels, and yields of subsequent crops of winter wheat (Triticum aestivum L.) and spring barley (Hordeum vulgare L.). The Austrian winter pea-winter wheat-spring barley (GMP-WW-SB) rotation was compared with seed pea-winter wheat-spring barley (SP-WW-SB), spring barley-winter wheat-spring barley (SF-WW-SB) and summer fallow-winter wheat-spring barley (SF-WW-SB) cropping sequences at two sites similar in annual precipitation. After harvest of the initial rotational crop, plots were divided into four subplots and four rates of N were applied as a topdress application following planting of 'Stephens' winter wheat. Spring barley was planted the third year. Winter wheat yields, spring barley yields, and inorganic soil N were not significantly affected by rotation X N fertilizer interactions. Winter wheat yield averages following GMP, SP, SF, and SB were 6.6, 6.4, 6.3, and 4.7 Mg ha-1, respectively. Average N fertilizer equivalent values of 94, 75, and 68 kg ha-1 were provided by GMP, SP, and SF, respectively, to the following winter wheat crop. Yield differences resulting from crop rotation or N fertilization rate were not observed in the third year of the cropping sequence. Austrian winter peas used as either a GMP or SP crop provided more inorganic N for the following winter wheat crop than SF or SB. From a 3-yr total yield the SP-WW-SB was the most efficient cropping sequence, as cereal yields were comparable to the GMP-WW-SB and SF-WW-SB rotations; however, since SP was harvested, three crops instead of two (other rotations) were produced. Agronomy journal. Mar/Apr 1989. v. 81 (2). p. 258-264. Includes references. (NAL Call No.: DNAL 4 AM34P).

1243

Fertilizer placement effects on growth responses and nutrient uptake of sweet corn, snapbeans, tomatoes and cabbage.
CSOSA2. Smith, C.B. Demchak, K.T.; Ferretti, P.A. New York, N.Y. : Marcel Dekker. Communications in soil science and plant analysis. 1990. v. 21 (1/2). p. 107-123. Includes references. (NAL Call No.: DNAL S590.C63).

1244

Incorporation of crucifer green manures to reduce Aphanomyces root rot of snap beans.
Parke, J.L. Rand, R.E. Fort Collins, Colo : Howard F. Schwartz, Colorado State University. Annual report of the Bean Improvement Cooperative. 1989. v. 32. p. 105-106. Includes references. (NAL Call No.: DNAL SB327.A1B5).

1245

Influence of cultivar, nitrogen, and frequency of insecticide application on vegetable leafminer (Diptera: Agromyzidae) population density and dispersion on snap beans.
JEENAI. Hanna, H.Y. Story, R.N.; Adams, A.J. College Park, Md. : Entomological Society of America. Journal of economic entomology. Feb 1987. v. 80 (1). p. 107-110. Includes references. (NAL Call No.: DNAL 421 J822).

1246

Tissue and cellular distribution of glutamine synthetase in roots of pea (Pisum sativum) seedlings.
PLPHA. Vezina, L.P. Langlois, J.R. Rockville, Md. : American Society of Plant Physiologists. The effect of nitrate application on glutamine synthetase activity in roots of pea (Pisum sativum L.) seedlings (2 weeks old) was studied. Separation of organelles from root fragments by sucrose density-gradient centrifugation revealed that both nitrite reductase and glutamine synthetase activities increasedin root plastids as a response to nitrate application and that no such response was induced by ammonium application. Glutamine synthetase activity was also found to increase in plastids with distance from apex in nitrate-treated plants, the highest specific activity being located in the fourth 1-centimeter segment. Separation by SDS-PAGE and characterization by Western blotting showed that cytosolic glutamine synthetase contains one subunit polypeptide (28 kilodaltons) and that plastid glutamine synthetase contains both the 38-kilodalton subunit and a heavier subunit. When nitrate was present in the nutrient solution, the heavier subunit increased in abundance in protein fractions obtained from purified root plastids. Plant physiology. July 1989. v. 90 (3). p. 1129-1133. ill. Includes references. (NAL Call No.: DNAL 450 P692).

1247

Bean root rot unaffected by herbicides in a crop rotation system.
Gilbertson, R.L. Ruppel, E.G.; Schweizer, E.E. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. Mar 1986. v. 29. p. 26-27. (NAL Call No.: DNAL SB327.A1B5).

1248

Cassava-cowpea and cassava-peanut intercropping. II. Leaf area index and dry matter accumulation.
AGJOAT. Mason, S.C. Leihner, D.E.; Vorst, J.J.; Salazar, E. Madison, Wis. : American Society of Agronomy. Agronomy journal. Jan/Feb 1986. v. 78 (1). p. 47-53. Includes references. (NAL Call No.: DNAL 4 AM34P).

1249

Cassava-cowpea and cassava-peanut intercropping. III. Nutrient concentrations and removal.
AGJOAT. Mason, S.C. Leihner, D.E.; Vorst, J.J. Madison, Wis. : American Society of Agronomy. Agronomy journal. May/June 1986. v. 78 (3). p. 441-444. Includes references. (NAL Call No.: DNAL 4 AM34P).

1250

Economic analysis of four weed management systems.
WEESA6. Lybecker, D.W. Schweizer, E.E.; King, R.P. Champaign, Ill. : Weed Science Society of America. An economic analysis of four weed management systems employed on four crop sequences in a barley-corn-pinto bean-sugarbeet rotation in eastern Colorado was computed. Weeds were controlled in each crop with only conventional tillage or conventional tillage plus minimum levels of herbicide (systems 3 and 4), moderate levels of herbicides (system 1), or intensive levels of herbicides (system 2). Adjusted gross returns were higher for systems 3 and 4 where herbicide use was less/year and decreased over 4 yr than for systems 1 and 2 where herbicide use was higher/year and constant. When the four crop sequences were aggregated using yield and sucrose indices, the least herbicide-intensive weed management system had $440/ha/4 yr higher indexed adjusted gross return than the most herbicide-intensive weed managment system. An income risk analysis showed that the herbicide-intensive weed management system was not risk efficient and that producers would select one of the other three less herbicide-intensive weed management systems depending upon their risk preferences. Weed science. Nov 1988. v. 36 (6). p. 846-849. Includes references. (NAL Call No.: DNAL 79.8 W41).

1251

Effect of paraplowing on wheat and fresh pea yields.
Wilkins, D.E. Rasmussen, P.E.; Kraft, J.M. St. Joseph, Mich. : The Society. American Society of Agricultural Engineers (Microfiche collection). Paper presented at the 1986 Winter Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St. Joseph, Michigan 49085. Telephone the Order Dept. at (616) 429-0300 for information and prices. 1986. (fiche no. 86-1516). 13 p. Includes references. (NAL Call No.: DNAL FICHE S-72).

1252

Effect of subsoiling and irrigation regime on dry bean production in the Pacific Northwest.
SSSJD4. Miller, D.E. Madison, Wis. : The Society. Soil Science Society of America journal. May/June 1987. v. 51 (3). p. 784-787. Includes references. (NAL Call No.: DNAL 56.9 S03).

1253

The effects of pathogen numbers and tillage on root disease severity, root length, and seed yields in green peas.
PLDIDE. Kraft, J.M. Wilkins, D.E. St. Paul, Minn. : American Phytopathological Society. Plant disease. Nov 1989. v. 73 (11). p. 884-887. Includes references. (NAL Call No.: DNAL 1.9 P69P).

1254

Effects of plant diversity and density on the emigration rate of two ground beetles, Harpalus pennsylvanicus and Evarthrus sodalis (Coleoptera: Carabidae), in a system of tomatoes and beans.
EVETEX. Perfecto, I. Horwith, B.; Vandermeer, J.; Schultz, B.; McGuinness, H.; Dos Santos, A. College Park, Md. : Entomological Society of America. Environmental entomology. Oct 1986. v. 15 (5). p. 1028-1031. ill. Includes references. (NAL Call No.: DNAL QL461.E532).

1255

Effects of soil solarization on Rotylenchulus reniformis in the lower Rio Grande Valley of Texas.
JONEB. Heald, C.M. Robinson, A.F. Raleigh, N.C. : Society of Nematologists. Journal of nematology. Jan 1987. v. 19 (1). p. 93-103. Includes references. (NAL Call No.: DNAL QL391.N4J62).

1256

Effects of temperature on development of Heterodera glycines on Glycine max and Phaseolus vulgaris.
JONEB. Melton, T.A. Jacobsen, B.J.; Noel, G.R. Raleigh, N.C. : Society of Nematologists. Journal of nematology. Oct 1986. v. 18 (4). p. 468-474. ill. Includes references. (NAL Call No.: DNAL QL391.N4J62).

1257

Effects of tillage and spacing on snap bean production.
Mullins, C.A. Coffey, D.L. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1987. v. 30. p. 64-65. (NAL Call No.: DNAL SB327.A1B5).

1258

Effects of tillage methods and soil cover crops on yield and leaf elemental concentrations of snap bean.
AAREEZ. Grenoble, D.W. Bergman, E.L.: Orzolek, M.D. New York, N.Y. : Springer. Field studies were conducted in 1981-1983 with snapbeans (Phaseolus vulgaris L.) comparing tillage methods, cover crops and their effects on yield and concentration of nutrients in the plants. No-tillage (NT), strip-tillage (ST), and conventional tillage (CT) were compared in combination with two cover crops, red clover (Trifolium pratense) and rye (Secale cereale), and no soil cover. Yields were greatest with CT methods two out of three years. There was a trend towards higher snap bean yields following either of the cover crops compared to no soil cover; however, only in 1981 did presence of soil cover have a significant effect on yield. Leaf P was lower in crops with CT than with reduced tillage during each year. Leaf Al decreased as tillage decreased. Boron levels were always greater with reduced tillage as compared to CT. Boron concentrations in tissue were lower following rye as compared to red clover or no clover in two of the years. Applied agricultural research. Spring 1989. v. 4 (2). p. 81-85. Includes references. (NAL Call No.: DNAL S539.5.A77).

1259

The effects of winter cover crops on the production of cotton grown on a Norwood very fine sandy loam.
Millhollon, E.P. Beck, A.W. Bossier City, La. : The Station. Annual research report - Red River Research Station. Includes statistical data. 1987. p. 153-162. (NAL Call No.: DNAL 100 L9333).

1260

Evaluation of the green manure potential of Austrian winter peas in northern Idaho.
AGJOAT. Mahler, R.L. Auld, D.L. Madison, Wis. : American Society of Agronomy. The objective of this field study was to determine the effect of Austrian winter peas Pisum sativum spp. arvense (L.) Poir used as either a green manure (GMP) or seed pea (SP) crop on soil N levels, and yields of subsequent crops of winter wheat (Triticum aestivum L.) and spring barley (Hordeum vulgare L.). The Austrian winter pea-winter wheat-spring barley (GMP-WW-SB) rotation was compared with seed pea-winter wheat-spring barley (SP-WW-SB), spring barley-winter wheat-spring barley (SF-WW-SB) and summer fallow-winter wheat-spring barley (SF-WW-SB) cropping sequences at two sites similar in annual precipitation. After harvest of the initial rotational crop, plots were divided into four subplots and four rates of N were applied as a topdress application following planting of 'Stephens' winter wheat. Spring barley was planted the third year. Winter wheat yields, spring barley yields, and inorganic soil N were not significantly affected by rotation X N fertilizer interactions. Winter wheat yield averages following GMP, SP, SF, and SB were 6.6, 6.4, 6.3, and 4.7 Mg ha-1, respectively. Average N fertilizer equivalent values of 94, 75, and 68 kg ha-1 were provided by GMP, SP, and SF, respectively, to the following winter wheat crop. Yield differences resulting from crop rotation or N fertilization rate were not observed in the third year of the cropping sequence. Austrian winter peas used as either a GMP or SP crop provided more inorganic N for the following winter wheat crop than SF or SB. From a 3-yr total-yield the SP-WW-SB was the most efficient cropping sequence, as cereal yields were comparable to the GMP-WW-SB and SF-WW-SB rotations; however, since SP was harvested, three crops instead of two (other rotations) were produced. Agronomy journal. Mar/Apr 1989. v. 81 (2). p. 258-264. Includes references. (NAL Call No.: DNAL 4 AM34P).

1261

Fall-seeded legume cover crops for no-tillage corn in the humid East.
AGJOAT. Holderbaum, J.F. Decker, A.M.; Meisinger, J.J.; Mulford, F.R.; Vough, L.R. Madison, Wis. : American Society of Agronomy. No-tillage systems utilizing winter cover crops can reduce erosion and leaching losses. Fall-seeded legumes can also supply significant amounts of N to subsequent corn (Zea mays L.) crops. The suitability of 14 fall-seeded legumes, three small grains and four legume/grass mixtures was evaluated for winter covers from 1982 through 1985 on Matapeake silt loam (fine-loamy, mixed, mesic, Typic Hapludult) and Mattapex silt (fine-silty, mixed mesic, Aqualfic Normuldult) Coastal Plain soils as well as Delanco silt loam and Chester silt loam (fine-loamy, mixed, mesic, Aquic Hapludult) Piedmont soils. Hairy vetch (Vicia villosa Roth), crimson clover (Trifolium incarnatum L.) and Austrian winter peas Pisum

sativum (L.) Poir. were the most promising cover crops. Fall growth and early soil coverage was highest with crimson and lowest with vetch which had higher winter survival and spring growth. Peas and, to a lesser extent, crimson clover stands were damaged in some years by Sclerotinia trifoliorum Eriks. In some years top growth of vetch contained up to 350 kg N/ha. While N concentration varied among species, total N production was determined more by dry matter yield. Legume cover crops had a greater influence on corn grain yields on the heavier textured soils and longer growing season of the Coastal Plain. In 1985, N contribution to the subsequent corn crop was reduced when small grains were seeded with annual legumes. Results from these studies show that winter annual legumes can reduce N costs while providing better soil protection during winter months. Agronomy journal. Jan/Feb 1990. v. 82 (1). p. 117-124. Includes references. (NAL Call No.: DNAL 4 AM34P).

1262

Incidence and control of pest insects in conventional and no-tillage snap beans.
JESCEP. Sherrod, D.W. Wilson, H.P. Tifton, Ga. : Georgia Entomological Society. Journal of entomological science. Apr 1989. v. 24 (2). p. 161-167. Includes references. (NAL Call No.: DNAL QL461.G4).

1263

Irrigation performance in reduced tillage systems.
Yonts, C.D. Smith, J.A.; Bailie, J.E. St. Joseph, Mich. : The Society. American Society of Agricultural Engineers (Microfiche collection). Paper presented at the 1988 Summer Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St. Joseph, Michigan 49085. Telephone the Order Dept. at (616) 429-0300 for information and prices. 1988. (fiche no. 88-2012). 17 p. Includes references. (NAL Call No.: DNAL FICHE S-72).

1264

Long-term tillage and crop rotation effects on bulk density and soil impedance in northern Idaho.
SSSJD4. Hammel, J.E. Madison, Wis. : The Society. Conservation tillage management for winter wheat (Triticum aestivum L.) production in northern Idaho may increase bulk density (Pb) and soil impedance (SI) of surface layers and limit crop growth, particularly when combined with spring cropping practices which require cultural or tillage operations during moist soil conditions. Bulk density and SI were measured in a long-term tillage-crop rotation experiment after 10 yr of continuous management to determine if differences resulting from tillage or cropping practices existed. Soils of the experimental site were two similar series, Palouse (fine-silty, mixed, mesic Pachic Ultic Haploxeroll) and Naff (fine-silty, mixed, mesic Ultic Argixeroll) silt loams. Tillage treatments included conventional (CON, moldboard plow), minimum (MIN, chisel), and no-tillage (NOT). Crop rotations were a 2-yr winter wheat-spring pea (Pisum sativum L.) rotation and a 3 yr winter-spring barley (Hordeum vulgare L.)-spring pea rotation. Bulk density was determined on intact cores using gamma attenuation. Soil impedance was measured with a constant-rate penetrometer. Tillage had a significant ($P < 0.05$) effect on pb, but not SI. Crop rotation did not significantly influence either soil property. The main effect of depth and a tillage X depth interaction, however, produced significant ($P < 0.01$) differences on pb, and SI. Both MIN and NOT had SI values exceeding 1.5 MPa at a depth of 0.05 to 0.15 m, which were 0.5 to 1.0 MPa greater than CON. Higher SI values under reduced tillage while not preventing root growth may, when combined with cool, wet soil conditions during the spring, limit root function and decrease crop growth potential. Soil Science Society of America journal. Sept/Oct 1989. v. 53 (5). p. 1515-1519. Includes references. (NAL Call No.: DNAL 56.9 SO3).

1265

No-till snap bean management system in a white clover sod.
PNWSB. Lindgren, C.B. Ashley, R.A. Beltsville, Md. : The Society. Proceedings of the ... annual meeting - Northeastern Weed Science Society. 1986. v. 40. p. 93-97. Includes references. (NAL Call No.: DNAL 79.9 N814).

1266

Production of snap beans as affected by soil tillage method and row spacing.
JOSHB. Mullins, C.A. Straw, R.A.; Coffey, D.L. Alexandria, Va. : The Society. Conventional tillage (CT), no-tillage (NT), and rotary strip-tillage (RT) methods were combined with row spacings of 0.46 m (28 plants/m2) and 0.92 m (56 plants/m2) in 1985 and 1986 snap bean (Phaseolus vulgaris L.) tests with a split-plot factorial arrangement of treatments. Yields were lowest with NT and 0.92-m row spacings both years, while plant stands were lowest with NT and RT. Plant lodging was lowest with NT and highest with CT each year. Pod clustering and broken pods following machine harvest were lowest with NT both years, while rotten pods and percentage no. 2 to 4 sieve-size pods were lowest with NT in 1986. Incidence of broken pods was higher with the 0.46-m row spacing than with the 0.92-m row spacing in 1985 and the incidence of rotten pods was greatest with the 0.46-m row spacing in 1986. The 0.46-m row spacing improved yields over the 0.92-m spacing, with minimal difference in pod quality. Weed control was less effective with NT than with CT and RT methods. Journal of the American Society for Horticultural Science. Sept 1988. v. 113 (5). p. 667-669. (NAL Call

No.: DNAL 81 S012).

1267

Reciprocal effect of peas and oats for fodder in combined crops.
Proskura, I.P. Dverenina, O.T. New York, N.Y. : Allerton Press. Soviet agricultural sciences. Translated from: Vsesoyuznaia Akademiia Sel'skokhozyaistvennykh Nauk, Doklady, (12), 1988, p. 15-17. (20 AK1). 1988. (12). p. 23-26. Includes references. (NAL Call No.: DNAL S1.S68).

1268

Residual effect of metsulfuron applied during the fallow year on barley and lentils.
Mashhadi, H.R. Evans, J.O. S.l. : The Society. Research progress report - Western Society of Weed Science. 1988. p. 258-259. (NAL Call No.: DNAL 79.9 W52R).

1269

Screening living mulches/cover crops for no-till snap beans.
PNWSB. DeGregorio, R.E. Ashley, R.A. Beltsville, Md. : The Society. Proceedings of the ... annual meeting - Northeastern Weed Science Society. 1986. v. 40. p. 87-91. Includes references. (NAL Call No.: DNAL 79.9 N814).

1270

Seedling diseases of vegetables in conservation tillage with soil fugicides and fluid drilling.
PLDIDE. Sumner, D.R. Ghate, S.R.; Phatak, S.C. St. Paul, Minn. : American Phytopathological Society. Plant disease. Apr 1988. v. 72 (4). p. 317-320. Includes references. (NAL Call No.: DNAL 1.9 P69P).

1271

Systems approach to weed management in irrigated crops.
WEESA6. Schweizer, E.E. Lybecker, D.W.; Zimdahl, R.L. Champaign, Ill. : Weed Science Society of America. The impact of four weed management systems on weed seed reserves in soil, yearly weed problem, and production of barley, corn, pinto bean, and sugarbeet was assessed where these crops were grown in rotation for 4 consecutive years in four cropping sequences. Weeds were controlled in each crop with only conventional tillage or conventional tillage plus minimum, moderate (system 1), and intensive (system 2) levels of herbicides. Seed of annual weeds from 11 genera were identified, with barynyardgrass and redroot pigweed comprising 66 and 19%, respectively, of the initial 90 million weed seed/ha present in the upper 25 cm of the soil profile. After the fourth cropping year, overall decline in the total number of weed seed in soil was 53% when averaged over four cropping sequences and four weed management systems. Over the 4-yr period, about 10 times more weeds escaped control in system 1 than in system 2; and within a crop, the fewest number of weeds escaped control annually in barley. System 2 had the highers herbicide use in each cropping sequence, the fewest weeds at harvest, and the smallest adjusted gross return over the 4-yr period in three of four cropping sequences. Weed science. Nov 1988. v. 36 (6). p. 840-845. Includes references. (NAL Call No.: DNAL 79.8 W41).

1272

Tillage for sunflower control and for annual canarygrass and fieldbean production.
AGJOAT. Robinson, R.G. Madison, Wis. : American Society of Agronomy. Agronomy journal. July/Aug 1985. v. 77 (4). p. 612-616. Includes 13 references. (NAL Call No.: DNAL 4 AM34P).

1273

Water use by legumes and its effect on soil water status.
CRPSAY. Badaruddin, M. Meyer, D.W. Madison, Wis. : Crop Science Society of America. To make informed decisions on whether to include legumes in cropping systems, information is needed on water use by legumes and its effect on soil water availability to subsequent crops. The objectives of this study were to determine the water use, water use efficiency (WUE), and soil water depletion pattern of four grain legumes and three green-manure or forage legumes. Field studies were conducted on a Fargo silty clay (fine, montmorillonitic, frigid Vertic Haplaquoll) at Fargo and on a Perella-Bearden silty clay loam (fine-silty, mixed, frigid Typic Haplaquoll; fine-silty, frigid Aeric Calciaquoll) at Prosper, ND in 1986 and 1987. Soil water to a depth of 2.2 m was determined by the neutron attenuation method at 15-d intervals. Legume crops used 10 to 25% more seasonal water than wheat (Triticum aestivum L.) across environments, but WUE (kg dry matter ha-1 mm-1 of water) of legumes was 0 to 25% greater than that of wheat. Green-manure and forage legumes generally had greater water use and WUE than grain legumes, and this was associated with their longer growing season and higher dry matter production. Cumulative water depletion during June to September by green-manure, forage, and grain legumes was 70, 63, and 43 mm greater, respectively, than that of a fallow check, and was not significantly different from that of wheat in two of four environments. However, an increase in soil water content occurred at the 0- to 0.3-m soil depth for all treatments in the following spring across three environments. Soil water content in the spring following a legume was not significantly different from that following wheat and was only about 30 mm greater than that of fallow across environments. These

results indicate that growing some legumes in cropping systems may not substantially affect the soil water content compared to continuous cereal cropping or to fallow. Crop science. Sept/Oct 1989. v. 29 (5). p. 1212-1216. Includes references. (NAL Call No.: DNAL 64.8 C883).

1274

$10 weed control in no-till beans.
Brusko, M. Emmaus, Pa. : Regenerative Agriculture Association. The New farm. Feb 1987. v. 9 (2). p. 10-11. ill. (NAL Call No.: DNAL S1.N32).

1275

Herbicide residues from winter wheat plots: effect of tillage and crop management.
JEVQAA. Brown, D.F. McCool, D.K.; Papendick, R.L.; McDonough, L.M. Madison, Wis. : American Society of Agronomy. Journal of environmental quality. Oct/Dec 1985. v. 14 (4). p. 521-532. Includes references. (NAL Call No.: DNAL QH540.J6).

1276

Root rot induced in snap bean by Rhizoctonia solani AG-4 and AG-2 type 2 in conservation tillage following corn.
PLDIDE. Win, H.H. Sumner, D.R. St. Paul, Minn. : American Phytopathological Society. Plant disease. Dec 1988. v. 72 (12). p. 1049-1053. Includes references. (NAL Call No.: DNAL 1.9 P69P).

1277

Using straw in steep furrows to reduce soil erosion and increase dry bean yields.
JSWCA3. Brown, M.J. Kemper, W.D. Ankeny, Iowa : Soil Conservation Society of America. Journal of soil and water conservation. May/June 1987. v. 42 (3). p. 187-191. ill. Includes references. (NAL Call No.: DNAL 56.8 J822).

1278

Yield response of watermelon, tomato and pigeon pea to land preparation techniques in southern Puerto Rico.
JAUPA. Lugo-Mercado, H.M. Badillo-Feliciano, J.; Ortiz-Alvarado, F.H. Mayaguez : University of Puerto Rico, Agricultural Experiment Station. The Journal of agriculture of the University of Puerto Rico. Apr 1987. v. 71 (2). p. 203-208. Includes references. (NAL Call No.: DNAL 8 P832J).

1279

Leaf conductance in relation to rate of CO2 assimilation. II. Effects of short-term exposures to different photon flux densities.
PLPHA. Wong, S.C. Cowan, I.R.; Farquhar, G.D. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Aug 1985. v. 78 (4). p. 826-829. Includes 5 references. (NAL Call No.: DNAL 450 P692).

1280

Leaf conductance in relation to rate of CO2 assimilation. III. Influences of water stress and photoinhibition.
PLPHA. Wong, S.C. Cowan, I.R.; Farquhar, G.D. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Aug 1985. v. 78 (4). p. 830-834. Includes 16 references. (NAL Call No.: DNAL 450 P692).

1281

Investigations on the effect of ozone on leaves of pinto bean (Phaseolus vulgaris L.) and beech yearlings (Fagus sylvatica L.).
Masuch, G. Kettrup, A. Deerfield Beach, Fla. : VCH Publishers, c1985. Air pollution and plants / edited by Clement Troyanowsky. Presented at the 2nd "European Conference on Chemistry and the Environment," May 21-24, 1984, Lindau, West Germany. p. 142-145. Includes 3 references. (NAL Call No.: DNAL QK751.E97 1984).

1282

Beneficial arthropod behavior mediated by airborne semiochemicals. V Influence of rearing methods, host plant, and adult experience on host-searching behavior of Microplitis croceipes (Cresson), a larval parasitoid of Heliothis.
JCECD. Drost, Y.C. Lewis, W.J.; Tumlinson, J.H. New York, N.Y. : Plenum Press. Journal of chemical ecology. July 1988. v. 14 (7). p. 1607-1616. Includes references. (NAL Call No.: DNAL QD415.A1J6).

1283

Beneficial arthropod behavior mediated by airborne semiochemicals. III. Influence of age and experience on flight chamber responses of Microplitis demolitor Wilkinson.
JCECD. Herard, F. Keller, M.A.; Lewis, W.J.; Tumlinson, J.H. New York, N.Y. : Plenum Press. Journal of chemical ecology. July 1988. v. 14 (7). p. 1583-1596. Includes references. (NAL Call No.: DNAL QD415.A1J6).

1284

Beneficial arthropod behavior medicated by airborne semiochemicals. IV. Influence of host diet on host-oriented flight chamber responses of Microplitis demolitor Wilkinson.
JCECD. Herard, F. Keller, M.A.; Lewis, W.J.; Tumlinson, J.H. New York, N.Y. : Plenum Press. Journal of chemical ecology. July 1988. v. 14 (7). p. 1597-1606. Includes references. (NAL Call No.: DNAL QD415.A1J6).

1285

The effect of host-plant density of the numbers of Mexican bean beetles, Epilachna varivestis.
AMNAA. Turchin, P. Notre Dame, Ind. : University of Notre Dame. American midland naturalist. Jan 1988. v. 119 (1). p. 15-20. ill. Includes references. (NAL Call No.: DNAL 410 M58).

1286

Effects of E-64, a cysteine proteinase inhibitor, on cowpea weevil growth, development, and fecundity.
EVETEX. Murdock, L.L. Shade, R.E.; Pomeroy, M.A. College Park, Md. : Entomological Society of America. Abstract: E-64, a specific inhibitor of cysteine proteinases, was incorporated into artificial seeds at low levels (0.01-0.25% by weight). It prolonged developmental time and increased mortality of the larval cowpea weevil, Callosobruchus maculatus (F.), in direct proportion to its concentration in the artificial seeds. The fecundity of females emerging from the artificial seeds was significantly decreased by E-64 concentrations of 0.06% and higher. These observations are compatible with the hypothesis that the midgut cysteine proteinase in C. maculatus is essential for normal growth and development. Environmental entomology. June 1988. v. 17 (3). p. 467-469. Includes references. (NAL Call No.: DNAL QL461.E532).

1287

Genetic relationships among seventeen Aphidius (Hymenoptera: Aphidiidae) populations, including six species.
AESAAI. Unruh, T.R. White, W.; Gonzalez, D.; Woolley, J.B. Lanham, Md. : The Society. Annals of the Entomological Society of America. Nov 1989. v. 82 (6). p. 754-768. Includes references. (NAL Call No.: DNAL 420 EN82).

1288

Intra- and interspecific morphological variation in some Aphidius species (Hymenoptera: Aphidiidae) parasitic on the pea aphid in North America.
AESAAI. Kambhampati, S. Mackauer, M. Lanham, Md. : The Society. Annals of the Entomological Society of America. Nov 1988. v. 81 (6). p. 1010-1016. ill. Includes references. (NAL Call No.: DNAL 420 EN82).

1289

Intraspecific variation in the egg-spacing behavior of the seed beetle Callosobruchus maculatus.
JIBEE8. Messina, F.J. Mitchell, R. New York, N.Y. : Plenum Publishing. Journal of insect behavior. Nov 1989. v. 2 (6). p. 727-742. Includes references. (NAL Call No.: DNAL QL496.J68).

1290

New intermediates in the conversion of stigmasterol to cholestanol in the Mexican bean beetle.
LPDSAP. Svoboda, J.A. Cohen, C.F.; Lusby, W.R.; Thompson, M.J. Champaign, Ill. : American Oil Chemists' Society. Lipids. Oct 1986. v. 21 (10). p. 639-642. Includes references. (NAL Call No.: DNAL QP751.L5).

1291

Pests not known to occur in the United States or of limited distribution. 83. Bean butterfly.
Whittle, K. Hyattsville, Md. : The Service. APHIS 81 - U.S. Department of Agriculture, Animal and Plant Health Inspection Service. Sept 1987. (50). 10 p. ill., maps. Includes references. (NAL Call No.: DNAL aSB599.A3U5).

1292

Pests not known to occur in the United States or of limited distribution. 86. A tortricid moth.
Whittle, K. Hyattsville, Md. : The Service. APHIS 81 - U.S. Department of Agriculture, Animal and Plant Health Inspection Service. Sept 1987. (50). 6 p. ill., maps. Includes references. (NAL Call No.: DNAL aSB599.A3U5).

1293

Synthesis of proteins and nucleic acids by the pea aphid Acyrthosiphon pisum (Aphididae) in the absence of a full complement of dietary amino acids.
Srivastava, P.N. Srivastava, U.; Thakur, M.; Auclair, J.L. New York, N.Y. : Alan R. Liss, Inc. Archives of insect biochemistry and physiology. Mar 1987. v. 4 (3). p. 161-168. Includes references. (NAL Call No.: DNAL QL495.A7).

1294

Two new species of Nosema (Microsporida: Nosematidae) from the Mexican bean beetle Epilachna varivestis (Coleoptera: Cocinellidae).
JPROA. Brooks, W.M. Hazard, E.I.; Becnel, J. Lawrence, Kan. : Society of Protozoologists. The Journal of protozoology. Aug 1985. v. 32 (3). p. 525-535. ill. Includes 42 references. (NAL Call No.: DNAL 439.8 J82).

APICULTURE RELATED

1295

Optimum time of day for maximum flower opening of faba bean.
AGJOAT. De Pace, C. Geng, S.; Filippetti, A.; Ricciardi, L. Madison, Wis. : American Society of Agronomy. Agronomy journal. July/Aug 1985. v. 77 (4). p. 646-649. Includes references. (NAL Call No.: DNAL 4 AM34P).

1296

Intraspecific variation in the egg-spacing behavior of the seed beetle Callosobruchus maculatus.
JIBEE8. Messina, F.J. Mitchell, R. New York, N.Y. : Plenum Publishing. Journal of insect behavior. Nov 1989. v. 2 (6). p. 727-742. Includes references. (NAL Call No.: DNAL QL496.J68).

ANIMAL STRUCTURE

1297

Intra- and interspecific morphological variation in some Aphidius species (Hymenoptera: Aphidiidae) parasitic on the pea aphid in North America.
AESAAI. Kambhampati, S. Mackauer, M. Lanham, Md. : The Society. Annals of the Entomological Society of America. Nov 1988. v. 81 (6). p. 1010-1016. ill. Includes references. (NAL Call No.: DNAL 420 EN82).

1298

Effects of E-64, a cysteine proteinase inhibitor, on cowpea weevil growth, development, and fecundity.
EVETEX. Murdock, L.L. Shade, R.E.; Pomeroy, M.A. College Park, Md. : Entomological Society of America. Abstract: E-64, a specific inhibitor of cysteine proteinases, was incorporated into artificial seeds at low levels (0.01-0.25% by weight). It prolonged developmental time and increased mortality of the larval cowpea weevil, Callosobruchus maculatus (F.), in direct proportion to its concentration in the artificial seeds. The fecundity of females emerging from the artificial seeds was significantly decreased by E-64 concentrations of 0.06% and higher. These observations are compatible with the hypothesis that the midgut cysteine proteinase in C. maculatus is essential for normal growth and development. Environmental entomology. June 1988. v. 17 (3). p. 467-469. Includes references. (NAL Call No.: DNAL QL461.E532).

1299

New intermediates in the conversion of stigmasterol to cholestanol in the Mexican bean beetle.
LPDSAP. Svoboda, J.A. Cohen, C.F.; Lusby, W.R.; Thompson, M.J. Champaign, Ill. : American Oil Chemists' Society. Lipids. Oct 1986. v. 21 (10). p. 639-642. Includes references. (NAL Call No.: DNAL QP751.L5).

1300

Synthesis of proteins and nucleic acids by the pea aphid Acyrthosiphon pisum (Aphididae) in the absence of a full complement of dietary amino acids.
Srivastava, P.N. Srivastava, U.; Thakur, M.; Auclair, J.L. New York, N.Y. : Alan R. Liss, Inc. Archives of insect biochemistry and physiology. Mar 1987. v. 4 (3). p. 161-168. Includes references. (NAL Call No.: DNAL QL495.A7).

ANIMAL TAXONOMY AND GEOGRAPHY

1301

Genetic relationships among seventeen Aphidius (Hymenoptera: Aphidiidae) populations, including six species.
AESAAI. Unruh, T.R. White, W.; Gonzalez, D.; Woolley, J.B. Lanham, Md. : The Society. Annals of the Entomological Society of America. Nov 1989. v. 82 (6). p. 754-768. Includes references. (NAL Call No.: DNAL 420 EN82).

1302

Pests not known to occur in the United States or of limited distribution. 83. Bean butterfly.
Whittle, K. Hyattsville, Md. : The Service. APHIS 81 - U.S. Department of Agriculture, Animal and Plant Health Inspection Service. Sept 1987. (50). 10 p. ill., maps. Includes references. (NAL Call No.: DNAL aSB599.A3U5).

1303

Pests not known to occur in the United States or of limited distribution. 86. A tortricid moth.
Whittle, K. Hyattsville, Md. : The Service. APHIS 81 - U.S. Department of Agriculture, Animal and Plant Health Inspection Service. Sept 1987. (50). 6 p. ill., maps. Includes references. (NAL Call No.: DNAL aSB599.A3U5).

VETERINARY PHARMACOLOGY, TOXICOLOGY AND IMMUNE THERAPEUTIC AGENTS

1304

Toxic effect of the roasted and unroasted beans of Cassia occidentalis in goats.
VHTOD. Suliman, H.B. Shommein, A.M. Manhattan, Kan. : American Academy of Veterinary and Comparative Toxicoiogy. Veterinary and human toxicology. Feb 1986. v. 28 (1). p. 6-11. ill. Includes 18 references. (NAL Call No.: DNAL SF601.A47).

1305

Tridiphane 2-(3,5-dichlorophenyl)-2-(2,2,2-trichloroethy-l)oxirane an atrazine synergist: enzymatic conversion to a potent glutathione S-transferase inhibitor.
PCBPB. Lamoureux, G.L. Rusness, D.G. Duluth, Minn. : Academic Press. Pesticide biochemistry and physiology. Dec 1986. v. 26 (3). p. 323-342. Includes 40 references. (NAL Call No.: DNAL SB951.P49).

1306

Two new species of Nosema (Microsporida: Nosematidae) from the Mexican bean beetle Epilachna varivestis (Coleoptera: Cocinellidae).
JPROA. Brooks, W.M. Hazard, E.I.; Becnel, J. Lawrence, Kan. : Society of Protozoologists. The Journal of protozoology. Aug 1985. v. 32 (3). p. 525-535. ill. Includes 42 references. (NAL Call No.: DNAL 439.8 J82).

1307

Biological activities of hexane extract of Piper cubeba against rice weevils and cowpea weevils (Coleoptera: Curculionidae).
JESCEP. Su, H.C.F. Tifton, Ga. : Georgia Entomological Society. Journal of entcmological science. Jan 1990. v. 25 (1). p. 16-20. Includes references. (NAL Call No.: DNAL QL461.G4).

FARM EQUIPMENT

1308

Deposition and effectiveness of charged sprays for pest control.
TAAEA. Franz, E. Reichard, D.L.; Carpenter, T.G.; Brazee, R.D. St. Joseph, Mich. : The Society. Transactions of the ASAE - American Society of Agricultural Engineers. Jan/Feb 1987. v. 30 (1). p. 50-55. ill. Includes references. (NAL Call No.: DNAL 290.9 AM32T).

1309

Lentil harvesting losses in the Palouse.
Moden, W.L. Jr. Dowding, E.A.; Whitcraft, J.C.; O'Keefe, L.E. St. Joseph, Mich. : The Society. American Society of Agricultural Engineers (Microfiche collection). Paper presented at the 1986 Winter Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St. Joseph, Michigan 49085. Telephone the Order Dept. at (616) 429-0300 for information and prices. 1986. (fiche no. 86-1580). 12 p. Includes references. (NAL Call No.: DNAL FICHE S-72).

1310

Dry bean response to water stress.
Yonts, C.D. Nuland, D.S.; Nelson, L.A. St. Joseph, Mich. : The Society. American Society of Agricultural Engineers (Microfiche collection). Paper presented at the 1985 Winter Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St. Joseph, Michigan 49085. Telephone the Order Dept. at (616) 429-0300 for information and prices. 1985. (fiche no. 85-2600). 14 p. ill. Includes references. (NAL Call No.: DNAL FICHE S-72).

1311

Effect of irrigation level on yield of pinto dry beans and tenderness after cooking.
HJHSA. Bordovsky, D.G. Alexandria, Va. : American Society for Horticultural Science. HortScience. Aug 1987. v. 22 (4). p. 585-586. Includes references. (NAL Call No.: DNAL SB1.H6).

1312

Effect of irrigation on drymatter production and yield of common beans (Phaseolus vulgaris (L.)).
Hoogenboom, G. Jagtap, S.S.; Jones, J.W.; Boote, K.J. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. Mar 1986. v. 29. p. 127-129. Includes references. (NAL Call No.: DNAL SB327.A1B5).

1313

Effect of irrigation regimes on susceptibility of bean to Macrophomina phaseolina.
JRGVA. Diaz-Franco, A. Cortinas Escobar, H. Weslaco, Tex. : The Society. Journal of the Rio Grande Valley Horticultural Society. This publication is not owned by the National Agricultural Library. 1988. v. 41. p. 47-50. Includes references. (NAL Call No.: DNAL 81 L95).

1314

Effect of subsoiling and irrigation regime on dry bean production in the Pacific Northwest.
SSSJD4. Miller, D.E. Madison, Wis. : The Society. Soil Science Society of America journal. May/June 1987. v. 51 (3). p. 784-787. Includes references. (NAL Call No.: DNAL 56.9 S03).

1315

Forage phytomass potential of fababean (Vicia faba L.) under irrigation.
AAREEZ. Lockerman, R.H. Buss, D.A.; Wiesner, L.E.; Westesen, G.L. New York, N.Y. : Springer. A line-source sprinkler irrigation system was used to superimpose a decreasing soil moisture gradient on fababean (Vicia faba L.) at Bozeman and Manhattan, Montana, USA in 1982 and 1984, respectively. Plant height, seed yield, and straw phytomass were evaluated at evapotranspiration (ET) levels ranging from 354 to 540 mm (13.9 to 21.3 in.) in 1982 and 320 to 500 mm in 1984. Moisture had the greatest effect on plant height during the intermediate growth and development stages during both years. Total above-ground phytomass production, as a function of ET levels, ranged from approximately 5 to 11 Mg/ha (4461 to 9814 lb/A) in 1982 and 5 to 10 Mg/ha in 1984. Applied agricultural research. Fall 1989. v. 4 (4). p. 235-239. Includes references. (NAL Call No.: DNAL S539.5.A77).

1316

Irrigation management effects on spring pea seed yield and quality.
HJHSA. Raymond, M.A. Stark, J.C.; Murray, G.A. Alexandria, Va. : American Society for Horticultural Science. HortScience. Dec 1987. v. 22 (6). p. 1262-1263. Includes references. (NAL Call No.: DNAL SB1.H6).

1317

Irrigation performance in reduced tillage systems.
Yonts, C.D. Smith, J.A.; Bailie, J.E. St. Joseph, Mich. : The Society. American Society of Agricultural Engineers (Microfiche collection). Paper presented at the 1988 Summer Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St. Joseph, Michigan 49085. Telephone the Order Dept. at (616) 429-0300 for information and prices. 1988. (fiche no. 88-2012). 17 p. Includes references. (NAL Call No.: DNAL FICHE S-72).

1318

Using straw in steep furrows to reduce soil erosion and increase dry bean yields.
JSWCA3. Brown, M.J. Kemper, W.D. Ankeny, Iowa : Soil Conservation Society of America. Journal of soil and water conservation. May/June 1987. v. 42 (3). p. 187-191. ill. Includes references. (NAL Call No.: DNAL 56.8 J822).

1319

Water management effects on biomass production and seed yield of Phaseolus vulgaris (L).
Mahamadou, S. Hoogenboom, G.; Bennett, J.M.; Boote, K.J.; Jones, J.W. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1987. v. 30. p. 36-37. (NAL Call No.: DNAL SB327.A1B5).

1320

White mold control programs on irrigated dry beans.
Varner, G. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. Mar 1986. v. 29. p. 56-57. (NAL Call No.: DNAL SB327.A1B5).

1321

Yield and plant nutrient content of vegetables trickle-irrigated with municipal wastewater.
HJHSA. Neilsen, G.H. Stevenson, D.S.; Fitzpatrick, J.J.; Brownlee, C.H. Alexandria, Va. : American Society for Horticultural Science. HortScience. Apr 1989. v. 24 (2). p. 249-252. Includes references. (NAL Call No.: DNAL SB1.H6).

1322

Differences in seed physical & chemical characteristics of two dry bean isolines.
Carpenter, W.J. Hosfield, G.L.; Uebersax, M.A. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1988. v. 31. p. 30-31. Includes references. (NAL Call No.: DNAL SB327.A1B5).

1323

Product use, handling and storage considerations.
Slinkard, A.E. St. Paul, Minn. : Center for Alternative Crops and Products, University of Minnesota, 1987? . Grain legumes as alternative crops : a symposium / sponsored by the Center for Alternative Crops and Products, University of Minnesota, July 23-24, 1987. p. 151-156. Includes references. (NAL Call No.: DNAL SB317.L43G73).

1324

Thermal properties of pigeon pea.
CFWOD. Shepherd, H. Bhardwaj, R.K. St. Paul, Minn. : American Association of Cereal Chemists. Cereal foods world. July 1986. p. 466-470. Includes 31 references. (NAL Call No.: DNAL 59.8 C333).

1325

Differences in seed physical & chemical characteristics of two dry bean isolines.
Carpenter, W.J. Hosfield, G.L.; Uebersax, M.A. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1988. v. 31. p. 30-31. Includes references. (NAL Call No.: DNAL SB327.A1B5).

1326

Product use, handling and storage considerations.
Slinkard, A.E. St. Paul, Minn. : Center for Alternative Crops and Products, University of Minnesota, 1987? . Grain legumes as alternative crops : a symposium / sponsored by the Center for Alternative Crops and Products, University of Minnesota, July 23-24, 1987. p. 151-156. Includes references. (NAL Call No.: DNAL SB317.L43G73).

1327

Evaluation of cyanide contents in the primary gene pool of the lima bean, Phaseolus lunatus L.
Baudoin, J.P. Barthelemy, J.P.; Agneessens, R.; Maquet, A. Fort Collins, Colo : Howard F. Schwartz, Colorado State University. Annual report of the Bean Improvement Cooperative. 1989. v. 32. p. 60-61. Includes references. (NAL Call No.: DNAL SB327.A1B5).

1328

Interaction of nightshade and dry beans.
Mitich, L.W. Kyser, G.B. Sacramento, Calif. : California Weed Conference Office. Proceedings - California Weed Conference. Paper presented at a conference on "Education and Communication--the Keys to the Future," January 18-21, 1988, Sacramento, California. 1988. (40). p. 216-219. Includes references. (NAL Call No.: DNAL 79.9 C122).

1329

Strategies for chemical control of snap bean rust in Florida and their compatibility with Canadian residue tolerances.
PLDRA. Pohronezny, K. Francis, J.; Fong, W.G. St. Paul, Minn. : American Phytopathological Society. Plant disease. July 1987. v. 71 (7). p. 639-642. Includes references. (NAL Call No.: DNAL 1.9 P69P).

1330

Colorimetric determination of propoxur residues in vegetables and water.
BECTA. Appaiah, K.M. Sreenivasa, M.A.; Kapur, O.P. New York, N.Y. : Springer-Verlag. Bulletin of environmental contamination and toxicology. Sept 1985. v. 35 (3). p. 296-300. Includes references. (NAL Call No.: DNAL RA1270.P35A1).

1331

Effect of foliar applied simazine and ammonium nitrate on the elemental content of cowpea seeds.
JFDAZ. Meredith, F.I. Langdale, G.W.; Searcy, G.K.; Hollander, S.A. Chicago, Ill. : Institute of Food Technologists. Journal of food science. Jan/Feb 1985. v. 50 (1). p. 93-95, 105. Includes references. (NAL Call No.: DNAL 389.8 F7322).

1332

Effect of harvest date on yield and quality of several snap bean cultivars.
Mullins, C.A. Coffey, D.L. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1987. v. 30. p. 65-66. (NAL Call No.: DNAL SB327.A1B5).

1333

Changes in selected biochemical components, in vitro protein digestibility and amino acids in two bean cultivars during germination.
JFDAZ. Chang, K.C. Harrold, R.L. Chicago, Ill. : The Institute. This study investigates changes in lectin and trypsin inhibitor activity, SDS-PAGE peptide pattern, in vitro protein digestibility and amino acid composition during germination of two dry bean cultivars. Lectin activity in navy beans was reduced. Significant amounts of trypsin inhibitor activity in both navy and pinto beans remained after germination for 6 days. Glycopeptides, with molecular mass ranging from 25,000 to 27,000 daltons, from partial proteolysis of the major storage proteins were resistant to a multienzyme system. In vitro protein digestibility and amino acid composition were only slightly altered. Germination did not improve protein nutritional quality of dry beans. Journal of food science : an official publication of the Institute of Food Technologists. May/June 1988. v. 53 (3). p. 783-787, 804. ill. Includes references. (NAL Call No.: DNAL 389.8 F7322).

1334

Mississippi Pinkeye--a new protepea.
RRMSD. Hare, W.W. Thompson, P.G. Mississippi State, Miss. : The Station. Research report - Mississippi Agricultural and Forestry Experiment Station. Nov 1988. v. 13 (11). 4 p. ill. (NAL Call No.: DNAL S79.E37).

1335

Nutrient and sensory properties of dry beans (Phaseolus vulgaris L.) grown under various cultural conditions.
JFDAZ. Koehler, H.H. Burke, D.W. Chicago, Ill. : The Institute. Dry beans UI-114 (Pinto) and Rufus (Red Mexican) were field-grown under presence or absence of Fusarium root rot, drought or optimum water, low or high nitrogen fertilization. Raw bean powder was analyzed chemically for proximate composition, minerals, vitamins and amino acids, and by Tetrahymena pyriformis W for protein quality. Cooked beans underwent sensory evaluation. Protein content of raw beans generally varied inversely with irrigation. Rufus beans combined significantly more thiamin than comparable UI-114 beans. High-N non-diseased soils produced beans with methionine concentrations greater than those from low-N Fusarium-infected soils. Pinto UI-114 beans were rated significantly more acceptable than Rufus beans (P less than 0.001). Journal of food science : an official publication of the Institute of Food Technologists. July/Aug 1988. v. 53 (4). p. 1135-1138, 1198. Includes references. (NAL Call No.: DNAL 389.8 F7322).

1336

Zinc and phytate distribution in peas. Influence of heat treatment, germination, pH, substrate, and phosphorus on pea phytate and phytase.
JFDAZ. Beal, L. Mehta, T. Chicago, Ill. : Institute of Food Technologists. Journal of food science. Jan/Feb 1985. v. 50 (1). p. 96-100, 115. Includes references. (NAL Call No.: DNAL 389.8 F7322).

FEED CONTAMINATION TOXICOLOGY

1337

Toxic effect of the roasted and unroasted beans of Cassia occidentalis in goats.
VHTOD. Suliman, H.B. Shommein, A.M. Manhattan, Kan. : American Academy of Veterinary and Comparative Toxicology. Veterinary and human toxicology. Feb 1986. v. 28 (1). p. 6-11. ill. Includes 18 references. (NAL Call No.: DNAL SF601.A47).

1338

Performance of mungbean, cowpea, and soybean cut for greenchop, silage, and hay and effects of seed inoculation on forage yield and quality.
Morris, D.R. Nelson, D.B.; Friesner, D.L.; Barber, B.W. Baton Rouge? , La. : The Station. Annual progress report - Southeast Research Station, Louisiana Agricultural Experiment Station. 1988. p. 43-47. (NAL Call No.: DNAL S67.E22).

1339

Biological activities of hexane extract of Piper cubeba against rice weevils and cowpea weevils (Coleoptera: Curculionidae).
JESCEP. Su, H.C.F. Tifton, Ga. : Georgia Entomological Society. Journal of entomological science. Jan 1990. v. 25 (1). p. 16-20. Includes references. (NAL Call No.: DNAL QL461.G4).

1340

Acid precipitation effects on growth and yield responses of twenty soybean and twelve snap bean cultivars.
JEVQAA. Reddy, M.R. Madison, Wis. : American Society of Agronomy. Greenhouse studies were conducted to determine the effects of simulated acid precipitation on growth, yield, and nutrient content of soybean Glycine max (L.) Merr. and snap bean (Phaseolus vulgaris L.). Twenty cultivars of soybean and twelve cultivars of snap bean were grown in pots and treated with simulated precipitation at pH 2.5, 3.5, 4.5, or 5.6 (control). Soybean and snap bean plants were treated with simulated precipitation once a week beginning until fruit maturity. Soybean plants showed leaf scorching and yellowing of leaves at pH 2.5 and 3.5, whereas snap bean did not show any visible symptoms. Soybean and snap bean cultivars responded differently to acid precipitation treatments. 'McNair 700' and 'Pioneer 5482' soybean and 'Commodore' bush and 'Provider' bush snap bean cultivars yields were decreased significantly under acid treatments. Eighteen soybean and 10 snap bean cultivars were unaffected. In general, aid precipitation treatments resulted in a greater number of soybean pods without seed compared to the control. Treatments at pH 3.5 and 2.5 affected soybean and snap bean growth and yield more than the other pH levels. Potassium content of soybean shoot decreased significantly under acid precipitation treatments, whereas Ca, Mg, and micronutrient contents were not affected by low pH treatment. Nutrient content of snap bean was unaffected by acidity. Journal of environmental quality. Apr/June 1989. v. 18 (2). p. 145-148. Includes references. (NAL Call No.: DNAL QH540.J6).

1341

Assessing risk of solid waste compost.
BCYCDK. Dyer, J.M. Razvi, A.S. Emmaus, Pa. : J.G. Press. BioCycle. Mar 1987. v. 28 (3). p. 31-36. Includes references. (NAL Call No.: DNAL 57.8 C734).

1342

Differential responses of four bean cultivars to chronic doses of ozone.
JOSHB. Heck, W.W. Dunning, J.A.; Reinert, R.A.; Prior, S.A.; Rangappa, M.; Benepal, P.S. Alexandria, Va. : The Society. Journal of the American Society for Horticultural Science. Jan 1988. v. 113 (1). p. 46-51. Includes references. (NAL Call No.: DNAL 81 S012).

1343

Effect of electroplating factory effluent on the germination and growth of hyacinth bean and mustard.
ENVRA. Ajmal, M. Khan, A.U. Orlando, Fla. : Academic Press. Environmental research. Dec 1985. v. 38 (2). p. 248-255. ill. Includes references. (NAL Call No.: DNAL RA565.A1E5).

1344

Effect of oil well brine on germination and seedling growth of several crops.
OJSCA. Munn, D.A. Stewart, R. Columbus, Ohio : Ohio Academy of Science. Ohio journal of science. Sept 1989. v. 89 (4). p. 92-94. Includes references. (NAL Call No.: DNAL 410 OH3).

1345

Effect of relative humidity prior to and during exposure on response of peas to ozone and sulfur dioxide.
JOSHB. Kobriger, J.M. Tibbitts, T.W. Alexandria, Va. : The Society. Journal of the American Society for Horticultural Science. 1985. v. 110 (1). p. 21-24. Includes references. (NAL Call No.: DNAL 81 S012).

1346

Effects of nitrogen dioxide and nitrate nutrition on nodulation, nitrogenase activity, growth, and nitrogen content of bean plants.
PLPHA. Srivastava, H.S. Ormrod, D.P. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. July 1986. v. 81 (3). p. 737-741. Includes 27 references. (NAL Call No.: DNAL 450 P692).

1347

Effects of ozone on Mexican bean beetle (Epilanchna varivestis) feeding and egg-laying efficiency on bean (Phaseolus vulgaris L.).
Rangappa, M. Kraemer, M.E.; Dunning, J.; Benepal, P.S.; Robbins, E. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. Mar 1986. v. 29. p. 100. (NAL Call No.: DNAL SB327.A1B5).

1348

Effects of sulfur dioxide on nitrogen fixation, carbon partitioning, and yield components in snapbean.
JEVQAA. Griffith, S.M. Campbell, W.F. Madison, Wis. : American Society of Agronomy. Journal of environmental quality. Jan/Mar 1987. v. 16 (1). p. 77-80. Includes references. (NAL Call No.: DNAL QH540.J6).

1349

Efficacy of XE-1019 as a phytoprotectant against SO2 injury in snap bean.
PPGGD. Ku, J.H. Krizek, D.T.; Mirecki, R.M.; Lee, E.H. Lake Alfred, Fla. : The Society. Proceedings annual meeting - Plant Growth Regulator Society of America. 1987. (14th). p. 304-311. Includes references. (NAL Call No.: DNAL SB128.P5).

1350

Herbicide residues from winter wheat plots: effect of tillage and crop management.
JEVQAA. Brown, D.F. McCool, D.K.; Papendick, R.L.; McDonough, L.M. Madison, Wis. : American Society of Agronomy. Journal of environmental quality. Oct/Dec 1985. v. 14 (4). p. 521-532. Includes references. (NAL Call No.: DNAL QH540.J6).

1351

Interspecific variation in SO2 flux. Leaf surface versus internal flux, and components of leaf conductance.
PLPHA. Olszyk, D.M. Tingey, D.T. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Dec 1985. v. 79 (4). p. 949-956. Includes 29 references. (NAL Call No.: DNAL 450 P692).

1352

Investigations on the effect of ozone on leaves of pinto bean (Phaseolus vulgaris L.) and beech yearlings (Fagus sylvatica L.).
Masuch, G. Kettrup, A. Deerfield Beach, Fla. : VCH Publishers, c1985. Air pollution and plants / edited by Clement Troyanowsky. Presented at the 2nd "European Conference on Chemistry and the Environment," May 21-24, 1984, Lindau, West Germany. p. 142-145. Includes 3 references. (NAL Call No.: DNAL QK751.E97 1984).

1353

Joint action of O3 and SO2 in modifying plant gas exchange.
PLPHA. Olszyk, D.M. Tingey, D.T. Rockville, Md. : American Society of Plant Physiologists. Plant physiology. Oct 1986. v. 82 (2). p. 401-405. Includes references. (NAL Call No.: DNAL 450 P692).

1354

Measuring ozone sensitivity of white bean using digitized video image analysis.
Michaels, T.E. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. Mar 1986. v. 29. p. 20-21. (NAL Call No.: DNAL SB327.A1B5).

1355

Response of beans to simulated ambient and uniform ozone distributions with equal peak concentration.
JOSHB. Musselman, R.C. Huerta, A.J.; McCool, P.M.; Oshima, R.J. Alexandria, Va. : The Society. Journal of the American Society for Horticultural Science. May 1986. v. 111 (3). p. 470-473. Includes references. (NAL Call No.: DNAL 81 SO12).

1356

Uptake, translocation and metabolism of anthracene in bush bean (Phaseolus vulgaris L.).
ETOCDK. Edwards, N.T. Elmsford : Pergamon Press. Environmental toxicology and chemistry. 1986. v. 5 (7). p. 659-665. Includes 13 references. (NAL Call No.: DNAL QH545.A1E58).

MATHEMATICS AND STATISTICS

1357

A computer-based decision aid for managing bean rust.
Meronuck, R.A. St. Paul, Minn. : APS Press, c1987. Crop loss assessment and pest management / edited by P.S. Teng. p. 242-250. Includes references. (NAL Call No.: DNAL SB950.C77).

1358

Development of a Phaseolus crop simulation model.
Hoogenboom, G. Jones, J.W.; White, J.W.; Boote, K.J. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1987. v. 30. p. 34-35. Includes references. (NAL Call No.: DNAL SB327.A1B5).

1359

Differential responses of four bean cultivars to chronic doses of ozone.
JOSHB. Heck, W.W. Dunning, J.A.; Reinert, R.A.; Prior, S.A.; Rangappa, M.; Benepal, P.S. Alexandria, Va. : The Society. Journal of the American Society for Horticultural Science. Jan 1988. v. 113 (1). p. 46-51. Includes references. (NAL Call No.: DNAL 81 S012).

1360

Geometric mean of stress and control yield as a selection criterion for drought tolerance.
Samper, C. Adams, M.W. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. Mar 1985. v. 28. p. 53-54. (NAL Call No.: DNAL SB327.A1B5).

1361

Linkage analysis of hypersensitive resistance to four viruses in Phaseolus vulgaris L.
Kyle, M.M. Dickson, M.H.; Provvidenti, R. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. Mar 1986. v. 29. p. 80-81. Includes references. (NAL Call No.: DNAL SB327.A1B5).

1362

Measuring the effect of rust on pinto beans.
Lindgren, D.T. Steadman, J.R.; Schaaf, D.M. Geneva, N.Y. : Bean Improvement Cooperative. Annual report of the Bean Improvement Cooperative. 1988. v. 31. p. 100-101. (NAL Call No.: DNAL SB327.A1B5).

1363

Nonrandom patterns of bacterial brown spot in snap bean row segments.
PHYTA. Hudelson, B.D. Clayton, M.K.; Smith, K.P.; Rouse, D.I.; Upper, C.D. St. Paul, Minn. : American Phytopathological Society. Each leaflet on every plant in 37 5-m row segments and a single 12-m row segment from commercial snap bean fields was assessed for bacterial brown spot. Graphs of the proportion of diseased leaflets per plant (disease incidence values) versus plant position along the row suggested two types of nonrandom variability in disease: an extreme jaggedness superimposed on a slow, undulating change in disease. Arcsine square root-transformed disease incidence values were analyzed for spatial nonrandomness using three techniques: runs analysis, autocorrelation analysis, and autoregressive integrated moving average (ARIMA) modeling. All three techniques detected the slow, undulating change in disease incidence values; however, only ARIMA modeling detected the jaggedness and could quantify both patterns. A "generalized ARIMA(101) model" was found to describe 35 of the 38 data sets. The biological mechanism generating these patterns is unknown. Knowlegdge of the existence of such patterns is important for developing effective sampling strategies for this disease. Theoretical characteristics of the generalized ARIMA(101) model indicate that random start systematic sampling will provide a better estimate of total or mean brown spot in a row than simple random sampling. Phytopathology. June 1989 v. 79 (6). p. 674-681. Includes references. (NAL Call No.: DNAL 464.8 P56).

1364

Path coefficient analysis of effects of Rhizoctonia solani on growth and development of dry beans.
PHYTAJ. Van Bruggen, A.H.C. Arneson, P.A. St. Paul, Minn. : American Phytopathological Society. Phytopathology. Sept 1986. v. 76 (9). p. 874-878. Includes references. (NAL Call No.: DNAL 464.8 P56).

1365

Presence--absence sequential decision plans for Tetranychus urticae (Acari: Tetranychidae) in garden-seed beans, Phaseolus vulgaris.
JEENAI. Bechinski, E.J. Stoltz, R.L. College Park, Md. : Entomological Society of America. Journal of economic entomology. Includes statistical data. Dec 1985. v. 78 (6). p. 1475-1480. Includes references. (NAL Call No.: DNAL 421 J822).

1366

A probit planes method for analyzing seed deterioration data.
CRPSAY. Wilson, D.O. Jr. McDonald, M.B. Jr.; St Martin, S.K. Madison, Wis. : Crop Science Society of America. Efficient management of seed stocks depends on a accurate description of seed longevity in storage. This work was conducted to study the implementation of the probit analysis method of modeling seed deterioration. Samples of field bean seed (Phaseolus vulgaris L.) were stored at eight temperatures (20-60 degrees C) and four moisture levels (12-24 g H2O kg-1) from 0 to 372 d, and evaluated using the standard germination test. Probit analysis was applied to the entire data set simultaneously using nonlinear regression as well as the conventional environment by environment approach. Nonlinear regression was performed on the germination angles using the model statement: germination angle = arcsin square root of phi Ki-p/10(Ke-CwLogM-ChT-CqT2) where phi is a function that computes the probability that a random variable with a normal (0,1) distribution falls below the argument of the function; Ki is a seedlot constant, and Ke, Cw, Ch, and Cq are species constants. Regression yielded the following parameter estimates: Ki = 6.68 (95.4% initial germination), Ke = 9.08, Cw = 5.20, Ch = 0.0057 and Cq = 0.00079. Use of these parameters resulted in a fit (R2 = 0.83) comparable to that obtained by the conventional environment by environment approach (R2 = 0.80). Persistent lack of fit of deterioration curves to the normal distribution model occurred in both approaches. When probit analysis was performed by environment, specifying the initial germination of the seedlot as the natural response rate, linearity of the probits over time was significantly improved. This suggests that probit analysis of seed deterioration should be performed specifying a natural response rate (6% initially dead seeds in this case) if the initial germination is below 100%. Crop science. Mar/Apr 1989. v. 29 (2). p. 471-476. Includes references. (NAL Call No.: DNAL 64.8 C883).

1367

Sweep-net sampling for western spotted cucumber beetle (Coleoptera: Chrysomelidae) in snap beans: spatial distribution, economic injury level, and sequential sampling plans.
JEENAI. Weinzierl, R.A. Berry, R.E.; Fisher, G.C. Lanham, Md. : Entomological Society of America. Sweep-net and absolute density samples for adult western spotted cucumber beetle (WSCB), Diabrotica undecimpunctata undecimpunctata Mannerheim (Coleoptera: Chrysomelidae), in snap beans, Phaseolus vulgaris L., were analyzed using Iwao's patchiness regression and Taylor's power law. Iwao's patchiness regression described sweep-net and absolute density samples better than Taylor's power law. The equation that described the patchiness regression of sweep sampling data was M = 0.10 + 1.07m. Linear regression analysis of the relationship between WSCB relative density and snap bean pod damage provided the basis for estimating the economic injury level for WSCB in snap beans at a daily average of 4.1 beetles per 10 sweeps (corrected) during the 14 d preceding harvest. An average of 3.0 beetles per 10 sweeps (corrected) was proposed as the economic threshold. Thresholds adjusted to compensate for circadian variation in sweep sampling efficiency ranged form 1.2 to 3.3 beetles per 10 sweeps (uncorrected). Adjusted thresholds were used with alpha and beta values from the sweep-net patchiness regression to construct critical-density sequential sampling plans modified for specific sampling times. Sequential sampling plans for fixed-precision population density estimates also were constructed. Journal of economic entomology. Dec 1987. v. 80 (6). p. 1278-1283. Includes references. (NAL Call No.: DNAL 421 J822).

1368

Temperature and photoperiod influence reproductive development of reduced-photoperiod-sensitive mungbean genotypes.
JOSHB. Fernandez, G.C.J. Chen, H.K. Alexandria, Va. : The Society. Using the 9th and 10th International Mungbean Nursery (IMN) data, quadratic response surface models were developed to predict days to flowering (DF) of mungbean Vigna radiata (L.) Wilczek genotypes grown at 11-hr and 30 min and 13-hr and 30-min preflowering mean photoperiod and 22 to 30C mean diurnal temperature regimes. Both linear and quadratic effects were significant on DF and onthe rate of progress towards flowering (1/DF); however, only the linear effect was significant in days to maturity (DM). The effect of mean diurnal temperature was more pronounced than that of mean photoperiod on DF of reduced-photoperiod-sensitive (RPS) genotypes. The earliest DF (flowering tendency) was estimated at 34 days after planting at the optimum mean diurnal temperature of 28C and the optimum mean photoperiod of 12 hr. At the suboptimal temperature (mean diurnal temperature less than optimum mean diurnal temperature), the estimates of the base temperature Tb and the thermal time theta(r) were 10C and 555 degree-days, respectively. Thus, flowering dates of these RPS mungbean lines can be predicted, which in turn will assist in the selection of proper planting dates. Journal of the American Society for Horticultural Science. Mar 1989. v. 114 (2). p. 204-209. Includes references. (NAL Call No.: DNAL 81 S012).

DOCUMENTATION

1369

Semi-automatic survey of crop damage using color infrared photography.
PERSD. Ladouceur, G. Allard, R.; Ghosh, S.
Falls Church, Va. : American Society of Photogrammetry and Remote Sensing.
Photogrammetric engineering and remote sensing.
Jan 1986. v. 52 (1). p. 111-115. ill. Includes references. (NAL Call No.: DNAL 325.28 P56).

AUTHOR INDEX

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Pigeon peas (Cajanas cajan)
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1229,1278,1324

Cassia occidentilis
1146,1304,1337

Vigna (unspecified)
205,484,543,577,589,734,736,1046,1193

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Mungbeans (Vigna radiata phaseolusaureus)
34,86,95,97,98,112,175,186,207,210,237,250,301,318,334,364,372,374,
388,408,409,416,417,424,429,433,447,457,467,484,491,495,511,512,
526,538,542,580,601,602,603,627,635,644,738,973,1005,1014,1083,
1170,1171,1175,1179,1195,1210,1296,1338,1368

Profepea (Vigna sinensis)
206,239,460,654,772,1068,1202,1334

Lentils (Lens culinaris)
25,47,69,70,100,113,117,216,222,255,381,389,639,657,678,684,697,
698,815,893,914,937,949,957,991,993,999,1018,1039,1050,1054,1094,
1095,1102,1127,1142,1143,1157,1158,1165,1168,1180,1198,1214,1216,
1220,1221,1233,1268,1273,1309,1323,1326

Winged beans (Psophocaupus tetragonolohus)
66,289,349,399,432,486,545,607,1057

Vigna sesquipedalia
530,1043,1189,1190

Adzuki beans (Vigna angularis)
260,431,447,1083,1296

Mothbeans (Vigna aconitifolia)
398,487

Vicia (unspecified)
756,757

Fabubeans or Broadbeans (Vicia faba)
82,100,222,312,442,550,639,657,677,685,712,815,914,937,1050,1273,
1295,1315,1323,1326

Vicia sativa
78,277,1236,1240,1259,1261

Hairy vetch (Vicia villosu)
78,81,639,1240,1259,1261,1273

Cluster beans
637

Chickpeas (Cicer arietinum)
39,63,100,107,127,147,1983,222,273,278,287,351,404,481,506,657,778,
815,821,903,914,937,957,1030,1045,1050,1192,1323,1326

Yambeans (Pachyrhizus erosus)
280,1207,1239

Lablab purpurea
42,310,564,615,891,1004,1343